COMPUTER WEEKLY

NEWS IN BRIEF

Takeover of Safestore

THE media storage company Safestore has been taken over by its main shareholder, Lloyds underwriters Pellew, Perry and Raymond. The aim of the move is to inject development capital into the one-year-old firm to cope with the fast expansion of this business in the UK and to explore overseas markets.

The two other former main shareholders, John Stancioff and Simon Mountfsy, are staying with the company. Stancioff is handling overseas marketing while Mountfsy continues as marketing director.

Faster

SAMPLES of high-speed versions of the Intel range of peripheral interface circuits are now available for use with the 8085 microcomputer. All devices currently available for the Intel 8080 have been upgraded, and each will carry a "-5" suffix to its type number to denote the faster unit.

DME in Brisbane

ONE of the first users of the Direct Machine Environment on ICL's 2960 mainframe is Brisbane City Council, which installed a system in April as a stopgap. The Queensland capital has put out tenders for a replacement, and bidders include ICL, IBM, Honeywell, Fujitsu and Burroughs.

Polling

A POLLING feature now available with the NCR 250 electronic sales register enables data recorded during the day on the register's cassette to be automatically transmitted at night to a remote mainframe. NCR says that this can be any of its own range of machines or any other manufacturer's computer.

Major study into the future of electronic mail

THE first comprehensive study into the potential and the implications of electronic mail is being carried out by Mackintosh Consultants of London. One-third of the work will be carried out by another UK consultancy, Communications Studies and Planning.

The study is being performed for a number of clients headed by the Eurodata Foundation, representing all the European PTTs. Postal and telecommunication suppliers in the US are also subscribing to the $400,000 one-year study, and Mackintosh Consultants says that it is prepared to take on further clients.

"We shall be looking in detail at the situation in the US, Canada and Western Europe, and Japan will also be an area of inquiry," a Mackintosh spokesman told Computer Weekly. "Studies have been done into aspects of the subject such as word processing, but as far as we know, nobody has covered the full subject."

Detailed 10-year forecasts of markets for all forms of electronic mail equipment will be compiled.

The relative share likely to go to word processing and facsimile systems will be forecast; transmission systems and the adequacy of existing networks will be studied, and the social implications such as possible union resistance and the impact on the office environment will be examined.

Among the companies vitally interested in the results will be IBM, Xerox and AT&T, which are working hard on competitive integrated systems for office automation (CW, July 28).

European medical privacy rules

THE Council of Europe is developing a set of "model rules" for the protection of privacy in medical databases.

A meeting is to be held next month to discuss these draft rules, which the council will then offer the member countries as an example of the type of factors that should be considered when developing national legislation.

The Council, which represents 19 Western European countries, is already working towards a general convention on privacy in relation to computer-held information (CW, March 3).

Speaking at IFIP in Toronto last week, Dr Frits Honduis, head of the Council's public law division, explained that it was necessary to try to isolate the privacy needs for particular applications, such as medical and police data files, as well as more general issues.

He also said that it was vital to have integrated international agreements covering the flow of data across borders to complement any national legislation.

But he stressed that it would be virtually impossible to try to create common international standards to cover national legislation because of differing ways of life.

"One man's privacy in one country is another's public information elsewhere," he commented.

In Switzerland, for example, there is great sensitivity about bank account numbers, whereas in a draft Dutch data protection bill, account numbers are regarded as being in the public domain.

At the conference session at which Dr Honduis spoke, it was generally agreed that it would be virtually impossible to try to develop foolproof legislation to guarantee the protection of data in computer databases.

But a number of suggestions were put forward for providing reasonable safeguards, such as the right for an individual to add something to a file, for instance appending a message to a police record saying that the crime was committed in a political cause.

One speaker from the audience suggested that people should be given a legal right to lie if the information requested was thought to be irrelevant to the purposes of that organisation.

P to Q3

● From front page

been made available for the challenge.

But then the gremlins struck. First there was fault in the communications cable. Then, fatally, a problem with a disc interface.

The challenge will now take place in Seattle in October to coincide with a chess tournament organised in association with the ACM.

Amdahl has promised full support for that event. "We do not like to lose," a company spokesman commented.

SO this is what they mean by computer dating . . . Dateline staff Roger Simpson and Alison Rider get together over the Tally printer linked to the company's Systime 3000 computer. The system has made 100,000 dates since it was installed four months ago. The computer is affectionately known as Herbert — and if that's not funny the computer manager is called Devendra.

How did he get that name, which means god of bliss? "Well," he said, "I was given it by Bagwan Shree Rajneesh in Poona after taking Sanjee with him."

Glad we asked.

Leyland orders soon

LEYLAND Truck and Bus will soon place orders for computer systems for its new £32 million truck assembly plant. Decisions on the orders are expected at the end of next month.

Keith Evans, manufacturing director of the Heavy Vehicles Division, says that the assembly lines will be controlled from a central control room, with computers directing such functions as vehicle build sequence and production rate.

On the shop floor, minicomputers will control the operation of assembly equipment, such as conveyor belts. There will also be computer-controlled warehousing.

Leyland has studied the opposition, in particular the Scania truck plant in Sweden, and the Leyland plant will probably be modelled on this. The Scania facility currently uses an IBM 370-148 and a Datasaab D22.

Itel-Siemens deal

AN OEM contract for the Siemens ND-2 21,000 lpm laser printer has been signed with Itel, the US company which specialises in supplying plug-compatible alternatives to IBM's equipment. Development work is being done to make the ND-2 plug-compatible with IBM's 3800 laser printer, and Itel will market the resulting products world-wide.

£10m aid for industry

STATE aid totalling £10 million, brought in under Section 8 of the Industry Act 1972 to encourage investment by the UK instrumentation and automation industry, is now awaiting formal clearance by the EEC.

The aid will be administered by the Department of Industry's Computers, Systems and Electronics Division. It will be used to provide, on a selective basis, grants of up to 20 per cent of the net eligible costs of equipment, plant and machinery, and up to 15 per cent of new buildings.

It will be closely co-ordinated with the Product and Process Development scheme, aimed at supporting product developments, which was announced in July.

Safeguard against attack

PACKET-SWITCHING was not developed to improve digital computer communications but as a military safeguard against enemy attack crippling the communications system.

In a talk at IFIP in Toronto on the past, present and future of networks, Paul Baran, of Cabledata Associates, laid claim to the title of father of packet-switching when he recalled memoranda he had written in the early 60s while he worked for the Rand Corp.

"These memoranda," he said, "laid out the notion of packet switching in response to a fear of the impact of massive enemy attack.

"What was being sought were some insights into how to go about building tough, robust networks that would not come unstrung when stressed.

"All the side benefits beyond survivability and extreme reliability for distributed networks built with packet switching such as very low cost, evolved solely as by-products of the data processing required to be present in the basic network design.

"A network built to survive physical attacks that destroy half the communications lines but permit the residual system to operate still in a coherent effective manner, achieves approximately the same performance as a system in a benign world built of communications links that can be inoperative in about half the time."

Longer delays

THE System 34, launched with a flurry of angels tumbling all over the pages of the national Press last April, has been received with the predicted rapture by the marketplace (CW, April 21). But as a result, the nine months delivery originally quoted has now slipped to at least 11 months.

Printed in Great Britain by Q.B. Limited, Sheepen Place, Colchester CO3 3LJ, and published by IPC Electrical-Electronic Press Ltd, Dorset House, Stamford Street, London, SE1 9LU.

COMPUTER WEEKLY
Number 564 Thursday, August 25, 1977 Price 18p

Briefing

IBM's new division

SEMICONDUCTOR development and manufacturing has been pulled together under one roof by IBM with the formation of a General Technology Division in its General Business Group.

It will include the Burlington, Vermont, components plant and laboratory and the Manassas, Virginia, components laboratory. Both were previously part of the company's System Products Division, and the Manassas laboratory is to be relocated to Burlington.

Forecasting

RELEASE of the Treasury's economic model by the Scicon bureau for public use has resulted in the formation of a consortium from UK industry, commerce and local government. Using the model, the Independent Treasury Economic Model Club (Item) will publish quarterly short-range forecasts of the UK economy.

Modcomp boss

SAID to have extensive contacts within the US financial community, John Lobb has been tipped to take over as chairman of Modcomp at the end of September when he retires as chairman and chief executive of telecommunications equipment manufacturer Northern Telecom. Lobb was made a director of Modcomp a few weeks ago.

Eurodata tenders

ALTHOUGH more than 20 companies were either invited or showed interest in bidding for the contract to produce the next Eurodata study of future trends in European data communications, tenders have been submitted only by PA International, Logica, Leasco in partnership with Datel of West Germany, GSI of France and the Economist, Batelle-Institute of West Germany and Arthur D. Little Inc of the US.

Merger talks

AFTER selling its 48% share in the Milgo Corp to Racal Electronics earlier this year for about £30 million (CW, February 24), Applied Digital Data Systems is understood to be talking to an as yet unnamed large company about the possibility of a merger.

Fund-raising

DEBENTURES totalling $80 million are to be offered by Data General, to raise funds for the expansion of production facilities and to help finance continued growth.

New subsidiary

PROCESS control systems and engineering design software, developed by the Lucas Industries group for its own use, are to be marketed by a new subsidiary, Lucas Logic. Initially it is to concentrate on various specialist applications for the plastics industry.

EEC seeks aid of user groups

AS a first step towards giving computer users a bigger say in the development of the industry, the EEC Commission is inviting all user groups to ensure that their names and addresses are on its files.

In a letter to Computer Weekly, the Commission says, "In preparation for future intended consultations with users, the Commission of the European Communities wishes to be better informed about the activities of the different European users' groups . . . As the leading European weekly DP publication you are probably in a position to help us in updating our list of users' groups."

The Commission has already made it clear that it wants users' views in a call for an international user organisation which could speak with a unified voice.

User groups should send details of themselves to the Commission of the European Communities, DG III/B/2, Attention Mr Garric, 200, rue de la Loi, B-1049 Brussels, Belgium.

DIY prices continue to fall

By Martin Banks

LOW-COST "personal computing" kits suitable for business and educational applications will soon be available in the UK. One of these could be the fully-engineered system from the Tandy Corp, which is selling in the US for $600.

Further signs of falling prices in the DIY market are that the Pet system from Commodore Business Machines, scheduled to appear in the UK next year, could cost less than £600, the price quoted when it was announced (CW, May 5), and that Pertec has lowered the price of Altair by about 20 per cent.

The Tandy system, the TRS-80, is sold in the US through the company's Radio Shack retail chain, and demand is outstripping supply. In the UK and Europe it is planned to have the system on sale at selected Tandy hi-fi stores by the new year. First, however, the initial order glut has to be satisfied and the system re-engineered to meet power requirements on this side of the Atlantic.

The UK price is expected to be in the £400 to £450 range.

The basic TRS-80 configuration includes a Zilog Z-80 CPU with 4K bytes of RAM and 4K bytes of ROM, keyboard, VDU screen, cassette recorder and power supply, together with a limited Basic interpreter.

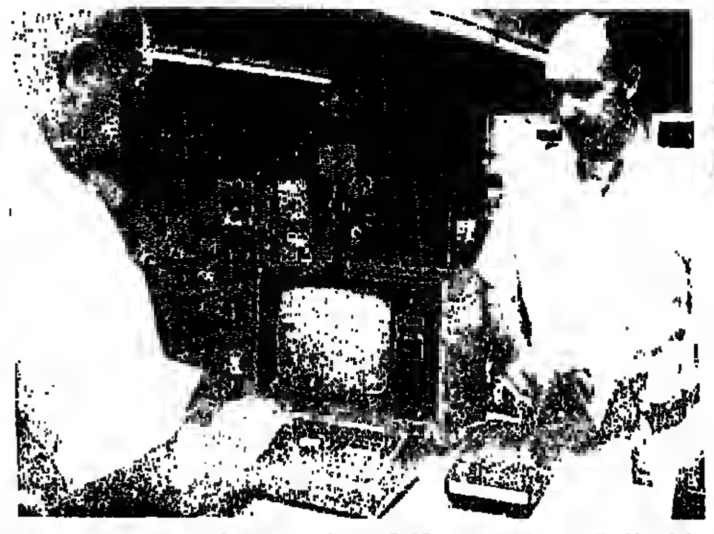
There is enough space in the cabinet to upgrade the internal memory to 16K bytes of RAM and 12K bytes of ROM, and the system architecture permits addressing up to 62K bytes of memory.

Initial cassette-stored software packages include programs for education, home economics, accounting and mathematics. More software will be introduced as the market demands, and packages are being developed for music generation and business applications. The latter reflects Tandy's confidence that the system will find a considerable market beyond the home-brewed scene.

More peripherals are also planned, including a floppy disc drive, a music synthesiser and a printer.

Substantial order backlogs and lack of suitable UK retail outlets are problems facing Commodore Business Machines,

● Turn to page 20



A computer for every business. This TRS-80 system from Radio Shack is being used in a US ironmongery shop to check stock and price data with the aid of a pre-recorded cassette program. When Tandy completes its marketing plans, the TRS-80 could be available off-the-shelf in the UK.

Retrial of anti-trust case

THE US Court of Appeal in San Francisco has ordered a retrial of Greyhound Leasing's 1972 anti-trust complaint against IBM. This charged IBM with restricting sales of equipment in order to monopolise the leasing market in which Greyhound operated.

The 1972 case, which was held in Phoenix, Arizona, was dismissed by Judge Walter Craig on the grounds of insufficient evidence to establish a relevant market or IBM's share of it. The judge also ruled that IBM's activity was a competitive response to economic factors and that damages incurred by Greyhound were speculative.

The Appeal Court has now said that Greyhound offered direct evidence to prove that the conduct complained of did occur and that this was sufficient to establish a prime facie case.

IBM's activities in the leasing market are also part of the US Justice Department's anti-trust suit against IBM.

Amdahl sets up European software centre in UK

THE UK has been chosen by Amdahl for its European software centre. The IBM-compatible mainframe manufacturer has opened a permanent office in Hounslow, Middlesex, and expects to have up to 20 staff there.

This shift of emphasis away from Amdahl's original European office, in Munich, is because the company sees the UK as the biggest potential market for its processors.

And as predicted (CW, June 16) the first UK customer is the big IBM-and ICL bureau Datasolve which is getting a four Mbyte 470V/5. The machine will be installed at Datasolve's new computer centre at Sunbury-on-Thames in November.

At present Amdahl's software support and marketing are handled from Munich, but the UK will become the software centre within a couple of months, says company secretary David Charles.

Sales will still be handled from Munich at first, but by the end of the year there will be two salesmen based in the UK. The UK office will handle selling in the Scandinavian and Benelux countries, while the German

● Turn to page 20

SPECIAL OFFERS

Programmers friend

Solve your debugging days blues with the Texas Instrument TI-Programmer calculator which converts between decimal, octal and hex at the press of a button. SAVE NEARLY £10 WITH THE COMPUTER WEEKLY SPECIAL OFFER. See Page 13.

OTHELLO RAGES

Two computer staff are in the British finals of the world's fastest growing game, Othello. And one of them, Hounslow Borough programmer Gary Read, says, "Othello is addictive. Everyone in the office has played it." Take advantage now of the Computer Weekly special Othello offer and join Gary and over 30 million others throughout the world who have become hooked on Othello. See page 19.

COMPUTER WEEKLY'S INSIDE NEWS

Go to Gilb

Sweet and sour—that will be the flavour of Tom Gilb's regular fortnightly column in Computer Weekly, as he alternates between exploding computer myths and providing useful hints to improve programming. Read his first sweet/sour package this week. Page 8

Spread it around

In this week's special supplement on distributed processing, users speak for and against this processing method. And an NCC security specialist highlights the new security risks which distributed processing raises. Page 15/19

Barron on Carter

Consultant Iann Barron has been studying the recent Carter report on the Post Office. As usual, Barron's conclusions are lucid, stimulating and thought-provoking. Page 4

We flip for IFIP

More from Toronto on IFIP — including naive users, databases and quotable quotes. Page 14

ALSO.....

APPOINTMENTS— PAGES 24-39

COMPUTER WEEKLY
Vol. 23 No. 564
Thursday, August 25, 1977
Editor:
Malcolm Peltu
Deputy Editor:
Tony Higgins
Assistant Editors:
Keith Jones
Tim Palmer
John Kavanagh
Stephen Bell
Advertisement Manager:
John A. Godley
Class Ad Manager:
Mike White
Publishing Director:
Eric Ickinger
IPC Electrical Electronic Press Ltd,
Dorset House, Stamford Street,
London, SE1 9LU.
Telephone: 01-261 8000
Telegrams/Telex:
25137 BISPRS G
Overseas Cables: Comweek Bisnespres LDN SE1
Branch Offices:
Birmingham
202 Lynton House,
Walsall Road,
Birmingham 22B
Telephone 021-356 4838
Manchester:
Statham House, Talbot Road,
Stretford, Manchester M32
Telephone 061-872 4211
New York:
205 East 42nd Street,
New York NY 10017
Telephone: (212) 867-2080
Published weekly on Thursday.
Registered at the Post Office as a newspaper. Price per copy 18p.
© IPC Business Press Ltd, 1977

Do you qualify for your own free copy?

If you work with computers you may be entitled to join the 76,000 readers who receive Computer Weekly free-of-charge each week. Britain's leading computer publication is sent free to the following categories in the UK and Eire only:

Company directors
Company secretaries
Management services executives
Civil servants responsible for computing
Management/computer consultants
Lecturers and teachers
Data processing managers
Systems analysts/O&M officers
Programmers
Operators
Computer salesmen
Field engineers

To find out if you qualify for a free weekly copy, write for a readership application card to the Controlled Circulation Department at IPC Business Press (Sales & Distribution) Ltd, 40 Bowling Green Lane, London EC1R 0NE.

Subscriptions for readers outside the above categories are as follows: One year, UK and overseas £14.50. US and Canada $37.70. Students, UK and Overseas £7.30. US and Canada $18.90. Airmail rates on request.

Subscription requests should be sent to: IPC Business Press (Sales & Distribution) Ltd, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH. Tel: 0444 59168.

Circulation inquiries: Applications for readership, subscriptions and changes of address are dealt with at the addresses listed above. To ensure regular delivery of Computer Weekly readers who wish the paper to be sent to a new address should send full details including a wrapper label bearing the serial number to the appropriate department.

Back numbers can be had on available, for 40p post free.

Circulation: 78,665 with the highest fully requested circulation in the UK. International Edition (10 issues a year) Circulation 95,218 (UK 76,081, Int 18,138)

ISSN 0010-4787

COMPUTERVIEW

Dijkstra articulates the voice of reaction

PROFESSOR Edsger Dijkstra is one of the most respected names in the development of programming methodology and, usually, an enlightened voice in trying to guide programming out of its oh so long dark ages.

Yet at IFIP in Toronto earlier this month (CW, August 18), Professor Dijkstra became the spokesman of reaction; a rallying point for those software people and DPMs who feel threatened by the new revolutionaries — the so-called amateurs who are challenging the old computer world riding the crest of the microprocessor wave.

Professor Dijkstra broke the academic calm of an IFIP session looking at the future of the micro by saying that the micro represented a great leap backwards of 25 years in the development of programming standards.

He said that he was appalled at the standards of programming he found in the hobbyist magazines. He said that micros could not be properly tested and could create chaos. He said that micros represented the latest step in turning money into "the currency of thought." Just because micros were cheap, he claimed, they were regarded as being great.

And many in the packed auditorium greeted his speech with the fervour of a revivalist meeting. "Right on" they seemed to be inwardly crying with each new Dijkstra rhetorical blow.

And in the discussions that followed in the bars and restaurants of the conference hotels, it became clear that Professor Dijkstra had touched on a raw nerve. And that those who supported him seemed to do out of the fear of a threat to their current jobs and status rather than out of a genuinely perceptive view of the future.

There can be no denying that micros are already changing most of our computer assumptions and values. In particular, they are bringing computer power into the hands of a whole new range of users, as with the £350 systems now available through the worldwide Radio Shack chain of shops (see front page).

Their full impact is still unpredictable and, like the mainframe and mini, they are, initially, at least, likely to create as many problems as they solve.

But to respond to the exciting challenge offered by micros in the blinkered and reactionary way that Professor Dijkstra did can only be justified as a last ditch attempt at self-preservation for a species that feels threatened with extinction — the traditional DP profession.

In terms of standardisation and programming methodology, micros can hardly be worse than the mainframe and mini worlds, with their proliferation of "standards" and poor programming traditions.

If anything, micros are more likely to promote standardisation, and one frequently voiced criticism of the micro is that it is forcing a standardisation on Basic as the high level language, when many people do not think it is the best language to standardise on.

It seems that the real motivation behind those supporting Professor Dijkstra's extremist views is twofold. Firstly, programmers fear that their very jobs could be threatened by a combination of firmware and enthusiastic amateur hobbyist programmers. And then DP managers fear that their budgets and their power bases are about to be undermined by user departments going their own way.

As Paul Baran, one of the founders of packet switching, claimed at IFIP, standard of hobbyist programming is often better than that in a commercial environment.

At the NCC in Dallas (CW, June 23), there were numerous examples of good amateur programming in the special personal computing exhibition. The winner of a competition at that exhibition had written his own operating system for a message switching system, with his own compiler and support systems software.

He did that in a couple of years in his spare time. And when asked why he had succeeded where many large companies had failed with far greater resources, he said that, firstly he did it for enjoyment not just as a job; and secondly, because he was not aware of many of the so-called problems, he never encountered them.

The DPMs fear of micros is that many users, frustrated by the DP department's bottlenecks and jargon-barbed-wire defence mechanisms, will turn to doing their own things.

The first sign of this has been the move to distributed processing. The next step could be the user department deciding to build their own system.

At the first do-it-yourself computer conference organised by Online earlier this year, there were a surprising number of businessmen in the audience who wanted to discover whether there will be a new alternative to the mainframe, mini and small business system which can be genuinely constructed to satisfy a specific business need.

The fears of both the programming and DPM professions are genuine ones and should be openly debated. But not under the guise of a spurious attack on microprocessors.

These fears should be faced and overcome. They should be seen as a challenge, not a threat; an opportunity, not a barrier.

For the DPM, the advent of distributed processing and the micro should be seen as an opportunity for the DPM to break out of the strait-jacket of the DP department and the machine-minding role into a fuller and more important position as the controller of information resources.

For, as sure as *x* is *x*, distributed processing and micros will lead to confusion *unless* there is some form of central co-ordination.

And for the programmer, the micro should open up a whole new range of applications to program.

Short of an economic catastrophe, there is no way now to stop the march of the micro. Surely it is best to learn to live, survive and prosper in the company of our new little friend. And not to cry out in frustration and rage against the inevitable giving way of an old style of life to something new, unpredictable and challenging.

Ten years ago...

COMPUTER WEEKLY, AUGUST 24, 1967

THE first UK CDC 6600 was planned by engineers Freeman Fox, Wilbur Smith to replace a 3300 at its bureau subsidiary Computers in Management. Under a £25,000 ACTP contract Plessey developed a commercial OCR system based on the Oscar reader. It handled OCR [illegible] at 220 chps . . . There was a chronic shortage of trained computer staff. Programmers were being offered salaries up to £1,500, and systems analysts up to £2,750 . . . The French Atomic Energy Authority was planning to install a top-of-the-line IBM 360/91 . . . In Russia the largest of the BESM range, the Model [illegible], completed commissioning at the Academy of Sciences, Moscow . . . GE's time sharing service, the Mark III [illegible], had 20 terminals, "[illegible] customers' offices" . . . The Post Office halted a scheme to maintain Emle files on a [illegible] . . . English Electric's offer for the preference and ordinary shares of Elliott-Automation was accepted by Elliott share-holders . . . CW's requested readership reached 20,000 less than a year after launching.

FOCUS

. . . on plans for the Post Office

HAVING a go at the Post Office is something of a national pastime. To the DP industry, however, it is no joke. It represents a stumbling block of considerable proportions. Anyone surmounting this particular block no doubt graduated at an outward bound course.

The recent Carter Committee proposals for the Post Office have, not surprisingly, triggered a healthy response from the computer industry.

The Post Office reply to the report, rather sadly, ends on the note that little more than a passing nod was given to the very considerable achievements of the organisation. Any nodding noted in the DP installation, would be from sheer frustration: such as, being informed that 2400 bps is good enough for the industry's present needs. Certainly the user can implement a 4800 bps, provided the datacum system has been authorised by the Post Office. Unfortunately, this is not possible at present. The Post Office has no equal in the Catch 22 application.

Pretty obviously, the Carter Committee were more at home with the postal side of the Post Office operations. They commented that few, if any, countries have a postal service better than our own. This observation alone tends to throw doubt on the quality of their other findings.

Few DPMS would have any reservations about the PO. Far from bestowing a friendly pat on the back, they would be more in the mood to insert the DP boot. Any organisation, state or private, which operated in such a remote mode from its customers deserves its quota of hostility to the full. But much to the surprise of computer management, industry comment has been decidedly restrained.

The CSA were more at pains to establish the fact that most of the Carter proposals were their ideas. The recent Hedsor Park weekend conference came to the conclusion that, with or without splitting, the PO had a key role in the future development of communication information technology. This realistic but fairly harmless view was challenged by Professor Iann Barron who stated that the PO could make or break the future development of communications technology.

Characteristically, of all computer organisations, the BCS suggests that we should make the best of the PO; it is after all the only one we have. This lack of approval is compounded by the view that the public network service should be implemented ahead of the private leased lines. Perhaps it is time that someone at the BCS leaves the cloisters of academic computing and ventures out into the real world of DP. It would not take long to learn the right message.

The DPMA has refrained from swiping at the PO: perhaps its ducks do not make exciting targets. Instead, they are organising a nationwide survey of PO telecoms activities. The objective of this project is apparently, to discover the average delay time for the PO to approve a new communications channel controller or the longest cross-country routing imposed between two DP centres in central London.

Langton Information Systems, on behalf of the DPMA, is compiling an industry survey covering such topics as projected involvement in PO facsimile or word processing transmissions, also questions covering possible involvement in computer oriented networks, such as electronic mails and Euronet.

It is to be hoped that the findings of the survey will be made known to all, particularly the PO itself. Currently, the Post Office is trailing the DP industry by about six years. Having advance notice of the computer industry's future intentions could well help to close the gap.

The Post Office is noted for engaged lines. Before too long, perhaps, it will be able to engage in providing communications lines on demand.

NCC in £2.5m EEC project

DATABASES, programming techniques and privacy and security have been singled out by the European Communities Council as areas for special study in a £2.5 million project.

The studies will be done by the UK's National Computing Centre in collaboration with its counterpart organisations in Germany, France and Italy, namely Gesellschaft für Mathematik und Datenverarbeitung, Institut de Recherche d'Informatique et d'Automatique and Consiglio Nazionale delle Ricerche.

The EEC is paying half the £2.5 million, the money coming from the £43 million earmarked for its four year computing plan (CW, October 28, 1976). The rest of the money will be provided by the national governments of the four organisations doing the work.

The UK government's contribution will be part of the £1.7 million already awarded to the NCC by the Department of Industry's Computers, Systems and Electronics Requirements Board (CW, March 17).

The database project will last about two years and will look at user requirements, develop guidelines for database selection, implementation and operation and make recommendations on standards and portability.

The programming techniques project is a short, nine-month initial study which will find areas of particular importance to users and suggest topics for further study.

The work on privacy and security will look at the possibility of harmonising different countries' legislation and will examine codes of practice and standards.

More to market Teletext decoders

THREE manufacturers, GEC, Mullard and General Instrument, will shortly follow Texas Instruments into the market with Teletext decoders. GEC is also working on a new flat display screen which could prove an attractive alternative to the domestic television set for receiving Viewdata.

Teletext is the generic name given to the BBC Ceefax and IBA Oracle services which add textual information to unused blanking lines in the television picture display. Viewdata is the experimental Post Office service which links the television set via the domestic telephone to a remote computer database.

Texas Instruments announced its Tifax decoder two years ago (CW, May 15, 1975), and last year Pye Labgear announced an aerial socket adaptor based on the Tifax decoder (CW, May 20, 1976).

The GEC decoder is likely to be available in sample quantities in November, and market forces will later determine its pricing. The device will be available both for Teletext alone and for Teletext and Viewdata, and it will be drivable by a number of bus lines which means that it could also be driven by a microprocessor.

This would enable it to be used for TV games and data recording, and also enable TV sets to be converted to low-cost simple VDUs. The power consumption should also be lower than that of the TI Tifax decoder.

The new flat screen that GEC is working on uses DC electroluminescence. The dimensions are 9in by 5in by 3in deep, and GEC believes it will be particularly suitable for business users of Viewdata who neither need nor want TV sets in their offices.

All the decoding circuitry could be incorporated in the panel, but two panels would be required to display a full Viewdata page, the limiting factor being the size of conducting glass substrate panels presently available.

The panels are also likely to be used as small peripheral displays for computers, and the technology could eventually lead to a flat alternative to the CRT for television sets.

The characters are displayed in yellow which GEC believes is less aggravating than the red of plasma displays. The panels should be cost-competitive with both plasma displays and CRTs.

Mullard's decoder will be similar to Texas Instruments, but will include background colour. It will be a basic five chip plus memory Teletext decoder, and additional circuitry for Viewdata will be introduced later.

Initially it will be offered as an assembled module, but some of the chips, notably the character generator, may be offered separately in the future.

Computing pioneer Sir Frederic Williams dies, 66

ONE of the world's computing pioneers, Sir Frederic Williams, has died, aged 66.

Sir Frederic invented a cathode ray tube storage device called the Williams Tube and led the team at Manchester University which developed what was claimed to be the first stored-program digital computer, and whose work established the university as the home of UK computing.

During the war he played a big part in developing radar, and his work gave him the idea for the Williams Tube. About 20 were installed in universities and government research establishments.

In 1946 Sir Frederic was appointed professor of electro-technics at the university. People who worked with him at the time say he transformed the undergraduate course and enlivened research. His own research led to "some beautiful and ingenious machines" including a car transmission system which did not need a gearbox.

Sir Frederic was awarded honorary doctorates by Durham, Sussex and Wales universities, and was elected a Fellow of the Royal Society. He won the Royal Society of Arts' first Benjamin Franklin medal.

He received his knighthood in the Birthday Honours last year.

'Over 2,000 orders for 3033'

ORDERS for IBM's 3033 processor totalled between 2,800 and 3,000 in the first two weeks, and even after weeding out spurious orders the company still has as many as 2,100 according to user surveys from a merchant banking firm, Kuhn Loeb and Company.

It says IBM will have trouble meeting this demand as it will not be able to step up production before next year. As a result some users may stay with a 370/168 or go to Amdahl or Itel.

Kuhn Loeb believes that IBM will deliver twenty-five 3033s a month starting next March. It expects the company to deliver between 600 and 650 machines in 1979 and about 720 in 1980. It says almost all users are disappointed with the delivery dates they have been given, including big customers like Ford and Exxon, which will not get their 3033s before September next year.

Delays hit RAF pay centre

BECAUSE of delays caused by having to replace its 2970 with a 2980 in the middle of software development, the RAF pay and records centre at Innsworth, near Gloucester, will have to continue running its DP workload on its Univac 1106 until 1979 instead of early next year as originally planned.

The 2970, which was ordered in 1974 (CW, December 12, 1974), is being replaced by a 2980 because it is not powerful enough to handle all the work at Innsworth (CW, April 7). It is being upgraded to a 2980 by replacing its OCP, SAC and SMAC in the field and the new configuration should be operational in a few weeks. The operating system will then be changed from VME/B version 5X10 to version 5X23.

However, all these upheavals have delayed applications software development and the Univac 1106, which is owned by the RAF, looks like handling most of the work at Innsworth for about another two years.

Networks study unlikely to affect PO plans

ALTHOUGH the National Committee on Computer Networks is halfway through a two-year study into what users want in the way of public data network facilities, it is unlikely to have much impact on the Post Office's plans for a successor to the Experimental Packet-Switched Service, EPSS.

The Post Office is hoping to make a decision on a public packet-switched network by the end of the year. It has said that if it decides to go ahead with such a network, the international standard X25 interface will be used (CW, July 21).

A spokesman for the NCCN told Computer Weekly that an interim report on what has been achieved so far would be presented to Industry Secretary Eric Varley before the end of September.

"Our concern is not so much with the immediate future as with the requirements for data facilities to the end of the century," he said.

Studies are being conducted into European networks, notably Transpac in France, where tariffs will be distance-independent.

"The approach of the Post Office in market research is necessarily to determine whether any proposed service will be commercially viable. We on the other hand will be trying to find out what developments might be desirable from standpoints other than pure economics," said the NCCN spokesman.

Council independence costs an extra £6,500

FEARS for its independence have led Epsom and Ewell Borough Council in north Surrey to order an ICL 2903 to handle its computing work even though a link to the big IBM 370/145 run by the Kingston and Sutton boroughs would have been £6,500 a year cheaper.

The 2903 will cost £52,980 a year, whereas the 370 link would cost £48,500. The council's finance committee recommend the 370 link, but a meeting of the full council voted 18 to 18 in favour of an in-house machine.

One council representative said, "There was no technical reason for rejecting the 370 link. It was purely an emotional decision."

A similar choice faced Nuneaton Borough Council, which also voted for an in-house machine instead of a link to the 370/145 run by Warwickshire County Council, although in this case the link would have cost more than an in-house replacement for the existing ICL 1901. A 2903 is a prime contender for this contract, too.

A different kind of opposition was voiced here by Labour councillor Terry Short, who said the council should ease the high local unemployment by replacing the computer by 40 clerical staff. Council leader John Haynes said this proposal was "laughed out of court."

US manager sacked for 'favouritism'

A COMPUTER project manager working for the US government has been dismissed for allegedly showing favouritism in awarding a $7.5 million contract.

The man, who was employed by the Department of Health Education and Welfare, has been accused of accepting 200 meals worth $3,000 since 1974, and trips to football games from firms competing for the student loan processing contract.

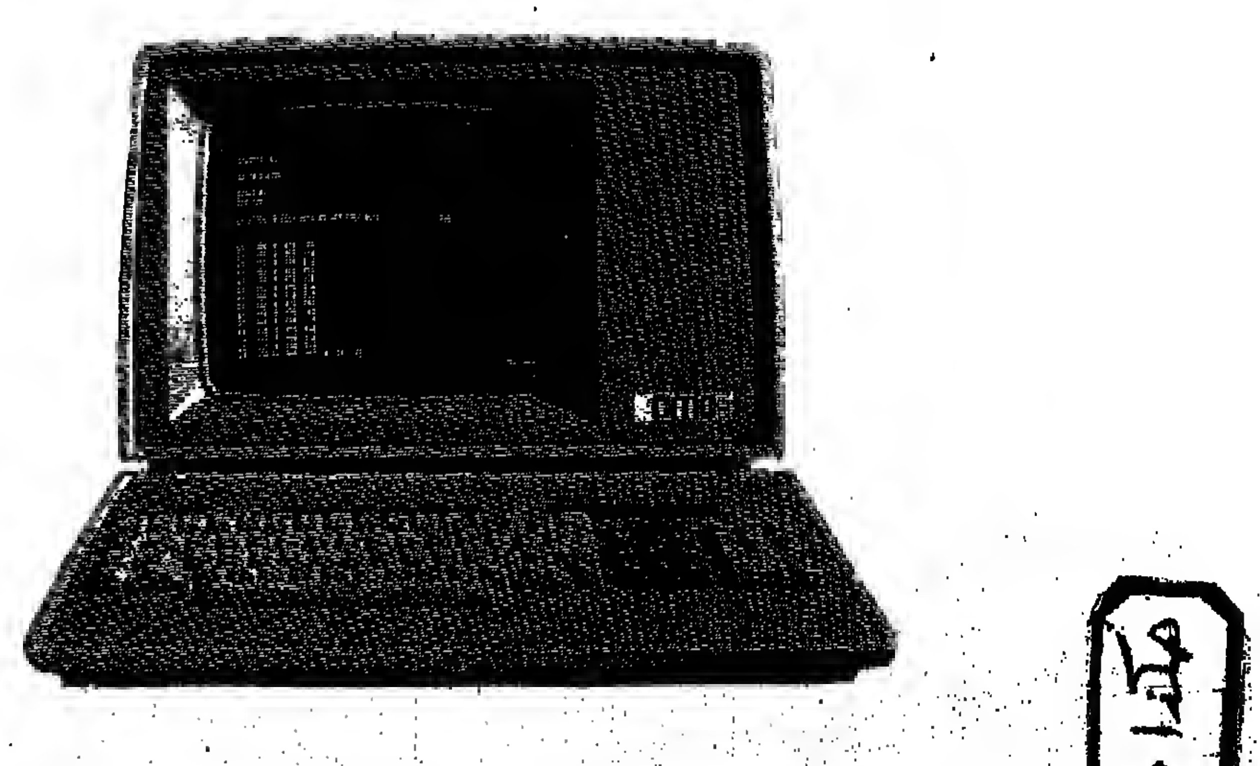
A federal grand jury is to investigate the contract award which finally went to On-Line Systems Inc, the Pittsburg-based time sharing bureau which is acquiring Atkins Computing Services (CW, August 4).

$108m profits for DEC

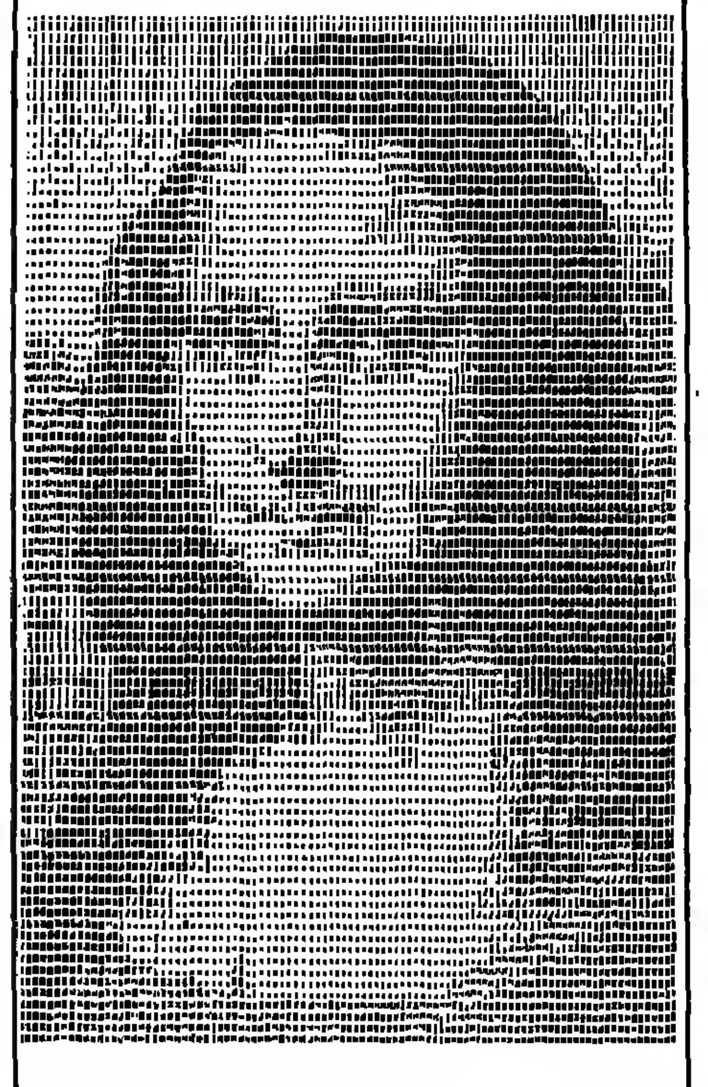
HIGHLIGHTS of Digital Equipment's results for the year ended July 2 include worldwide sales of $1,058 million, a 44% increase on the year before, and a 35% increase in European turnover to $256 million. Net worldwide profit was $108 million compared with $73 million the year before.

DEC is to offer $200 million worth of convertible debentures to pay back short-term loans incurred last year to finance the extra production, premises and equipment needed to cope with the demand for the company's products.

The capital raised will also help finance the expected continued growth.



DOWNTIME
by Chad



Picture-faking plot exposed

THE above is not, as one might suppose, an alphameric attempt to elucidate the mystery of the Mona Lisa smile, which has engaged the attentions of art historians and irreverent cartoonists since Leonardo's time.

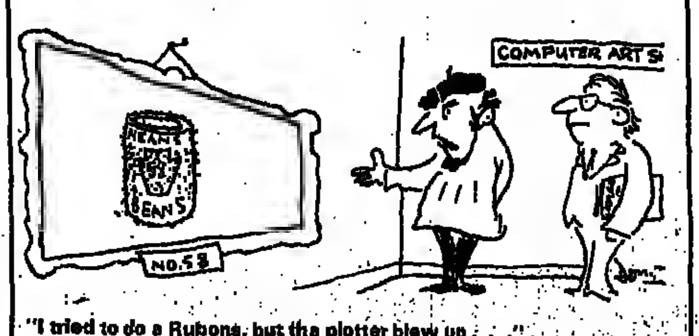
The Renaissance artist, who has been credited with envisaging or designing almost every technological breakthrough from the autogyro and the submersible to the calculating machine and the inter-continental ballistic missile, would undoubtedly have approved this use of a graphics plotter driven by Exeter University's ICL 472, located in the computer unit of the maths department. He might have gone further, given a similar system, and produced two further versions of La Gioconda, one undeniably pleased with life, the other perhaps more doom-laden.

The perpetrator of this particular pastiche was a programmer in the Exeter unit, Dr Ian Campbell, who specialises in wrestling with the more intractable problems of graphic output. As light relief, he produces alphameric Andy Capps and delectable pin-ups.

I have a feeling that this sophisticated variant of painting by numbers is practised in more computer departments than the DPMA ever dreamed of; it is also, of course, resorted to as a serious medium by contemporary artists, as the work of the Computer Arts Society will testify.

I would welcome suitable samples of the imaginative use of computer graphics, with relevant background information (models used, and so on), and hope, quality of print-out permitting, to publish one or two of the more intriguing works later. But please bear in mind the extended law of copyright, which now covers "reproduction by any mechanical or electronic means" of protected material.

The Computer Arts Society, by the way, publishes a bulletin called PAGE, eight times a year and free to members (membership is £2 a year, £1 for students). The aim of the society is to encourage the creative use of computers in the arts and to exchange information in this field. Secretary is John Lansdown, 50/51 Russell Square, London WC1B 4JX.



"I tried to do a Rubens, but the plotter blew up . . ."

After Carter...now we need another report–urgently

AT a total cost of £98,650, the Post Office Review Committee under Charles Carter has done a very good management consultancy job. Whether the professionals in that business would approve of amateurs being used for that purpose is another matter.

The Carter report* published in July, is the result of nearly a year's work in which the Carter Committee took evidence from 215 organisations and individuals, including the BCS, CSA, DPMA, IBM, ICL and NCC.

It is a comprehensive review of the activities of the Post Office, ranging from the invention of automatic switching equipment by Strowger, a Kansas City undertaker — "it is alleged that he found the operators were diverting his calls to other undertakers, thus losing him business, and he wished to devise a switching system which could not be so misused" — to the scandal of the Post Office pension fund — "a subject where truth is very much stranger than fiction" — and which, according to some accounting principles, adds ½p to the cost of a letter.

Within this review, there is very little discussion about the future of telecommunications or its convergence with computing, although these developments are explicitly recognised. "It is doubtful whether the public at large has any idea of the revolution in communications which will result from developments in progress. Microelectronics and microprocessors are adding a new dimension to the telephone and to the transmission and handling of data." The implications of this revolution are nowhere explored by the report.

One reason for this is the relaxed view that is taken of the development of the technology. "We do not believe that the widespread adoption of new methods of message transmission which use both postal and telecommunication facilities is likely within a period that should affect present thoughts about organisation."

The other reason lies in the careful wording of the terms of reference: "To examine the performance and main functions of the Post Office . . . To assess the policies, prospects and social significance of the Postal Business" — BUT not to carry out the same assessment for telecommunications. ". . . To consider whether the Post Office Act of 1969 places undue restrictions on the activities of the Post Office" — BUT not to consider whether the Act gives the Post Office undue monopoly powers.

The Post Office is a large and complex organisation, responsible for 2.8% of the gross domestic product, and for 4.5% of the total fixed investment. Apart from central government, it is the largest single employer in the country, with 410,000 employees. Thus, while much of the report has general relevance, only a small part is concerned with computing and its implications. Indeed, the subject of data communications is not mentioned at all, except in a passing reference to the Carterphone decision in the US.

There are three main areas where the Carter Committee recommendations impinge directly on computing—the restructuring of the Post Office, the development of System X, and future services.

The recommendation that the Post Office should be split into two authorities, one for posts and one for telecommunications, has received widespread publicity. In fact, the Post Office is already organised into separate businesses with independent management and accounting. The only point where they come together is the Control Board. The report makes the point that the structure "could be a loose federation of autonomous businesses sharing some common services for convenience . . . but this is not what happens.

"The structure lends itself all too easily to a style of management which is strongly centralised. We have received ample evidence of the great range of decisions which go to the Central Board and of the powerful control exercised by its chairman. This style is not one which can be recommended for continued application; it depends too much on the rare qualities of a particular man." Hence the split to ensure delegation.

The report takes a (relatively) optimistic view about the future of foot mail. "It is very difficult indeed to predict the rate of displacement of the mails by other technology, but it will probably be slower than the enthusiasts for that technology predict. Our judgement is, therefore, that though there may well be grave problems 20 years ahead, it is too soon to accept the decline of the posts as inevitable."

The consequences of a more pessimistic view are implicit in the report, which argues that mail costs are largely fixed and independent of volume. Any switch to electronic mail would, therefore, cause the economics of the foot system to deteriorate rapidly. Whether the report would have made a different recommendation on organisation if it had taken a different view of the future, is difficult to assess.

The argument about the organisation of the Post Office is unfortunate, in that it distracts attention from the important problem. That is to achieve an innovative telecommunications organisation with dynamic top management. Whether splitting the Post Office in two will do this remains to be proven.

System X is the Post Office's stored program control (SPC) exchange technology, due to be introduced in the 1980's. Its story demonstrates exactly why the Post Office needs to be an integral part of any policy towards information technology.

The Post Office rejected the concept of SPC in the late 1960s "because the estimated cost and the risk of delay associated with its development were too high . . . the unmistakable consequence is that the Post Office and the British telecommunications industry have no operationally proven SPC system available either for use at home, or for export, while their main competitors abroad have this desirable product available and are five or six years ahead of them . . System X is clearly a 'make or break' project for the United Kingdom. The time scale is critical. Overruns in time or cost could be serious . . . This project is falling behind schedule, retarded by a complex apparatus of committees and discussions . . Serious waste and grave harm to the national economy could result . . . There is a further worry for the manufacturers, namely that the timescale for the introduction of System X is not particularly critical for the Post Office; indeed the Post Office has yet to make any firm commitment at all to its eventual purchase."

Consultant Iann Barron describes Charles Carter's Post Office Review Committee report as "a very good management consultancy job . . . an excellent document in most of the areas it covers."

But he points out that the report does not consider the policies, prospects, and social impact of an innovative telecommunications authority. This, says Barron, is a subject of the greatest importance, and the Secretary of State for Industry should commission a further report to repair the omission — urgently.

The failure by the Post Office to recognise the significance of SPC has already jeopardised the position of the UK telecommunications industry and will threaten the position of the electronics and computing industries. The possibility that System X may be delayed, either accidentally or deliberately by the Post Office, must be a matter for the gravest concern, not just because of its implications to the industry, but because the availability of an effective modern communications system is becoming an increasingly important factor in our economic wellbeing.

Although the report recognises that the changing technology may have an impact on the future of the Post Office and the services it provides, it makes no attempt to come to grips with the subject, nor does it make any significant recommendations. The problems of tariffing, value added services and foreign attachments are recognised, but not explored in depth.

On tariffing, the report says "It is very important if business users are to plan ahead intelligently, that the tariff structure of the Post Office remains reasonably stable, reflecting only changes in the cost of services."

On value added services: "The question will arise as to w should be allowed to ma them in the United King. We do not believe this to b issue which admits of a si answer."

On foreign attachments w are not convinced that balance of advantage in community favours the co nuation of the existing bou ries to the monopoly in t United Kingdom. However, du not feel able to define t boundary without a more tailed study of the effect such a change would have subscribers and on the servi

The report recognises t "these issues are of s long-term importance that developing situation should kept under review". For purpose it is proposed the Secretary of State's Co should be set up to review long-term communicati strategy on a continuing basi

The report says: "We are aware that advisory councils regarded with a certain cynic as the invention of those w wish to dress the shop wi without conceding any influence on the course of business. We do not see Council in that light". It however, difficult to see it in other light, and this is, with doubt, the weakest aspect of whole report.

In most of the areas it co the Carter report is an exce document. What it does not to consider the policies, p pects and social impact of innovative telecommunicat authority. This is the subje greatest importance, and Secretary of State for Ind should commission a fu report to repair the omissi urgently.

---

* Report of the Post Office Re Committee Chairman C. F. C FBA, HMSO Cmnd 6850. £2.35

Adabas Down Under

THE database management sy tem Adabas, from Software A has found its way to Austra via South Africa. Existing Sou African Adabas agent Syste Programming Pty Ltd has be discussions with Australi company Sigma Data, itself by expatriate South Africans.

The most likely policy will an initial co-operative mark ing venture in Australia, S Sigma Data expects to back leaving SPPL to do its o Australian marketing.

SPPL is an associate comp of UK-based SPL Internation

Prices out

SUBSTANTIAL price cuts ha been announced by Rapid Rec for the Intal 2708 and 2716 U erasable PROMS.

The one-off price for the 27 a 1K by 8 digit device, is no £27.26, and £18.75 for quanti of more than 100. The 2716, by 8 digit device, has be reduced from around £12 £57.38 each. The 100-up price also been reduced, and n stands at £39.86. Both devi are available from stock.

NEWS IN BRIEF

Book sales top 16,000

THE sale of books is one of the fastest growing activities of the National Computing Centre. Figures just released show that in the last year over 16,000 have been sold. Publications sales accounted for £92,000 of the NCC's income last year.

An illustrated colour catalogue of over 80 current titles is now available from the NCC in Oxford Road, Manchester M1 7ED.

A DATASAAB D15 system has been bought by Dimex, a solvents and special coatings firm of Solihull, Warks. The system, valued at £30,000, includes two VDUs, a serial page printer, 5 Mbytes of disc storage and a 100 lpm printer.

OVER the next three years, Control Data projects an annual growth rate of 15 per cent in its $150 million OEM business and 22 per cent in its $75 million peripheral systems business, including IBM plug-compatible products, CDC marketing and planning vice-president Gordon Brown testified in the US government's anti-trust case against IBM.

A COMPUTER system based on Cambridge Computer Services' 1903A has been designed for Reavell, Ipswich, a Compair Group company. About 20,000 individual items will be stored on the system for Reavell, which produces compressors and compressor parts.

A CONTRACT to service Digico 16V minicomputers in West Germany has been awarded to Systems Maintenance and Service of Sunbury-on-Thames. The work will be done on behalf of Digico's West German agent, LOS GmbH of Mannheim, and involves maintenance of more than 12 systems.

FEATURING four interchangeable type founts and offering editing features as part of the standard equipment, the Quadritek 1200 computerised phototypesetting system, manufactured in the US by Itek Graphic Products of Rochester, NY, and costing £8,500 will be available in the UK from September.

A SYSTEM to aid the administration of about 40,000 pension policies is to be developed for Abbey Life Assurance by BIS Applied Systems. The software will run on an IBM 370/145 at Abbey Life's head office in Bournemouth and is expected to be functioning by the end of this year.

THE German small systems manufacturer Nixdorf has moved into Scotland through a distributor, Create Systems of Perth. Create Systems was formed by two former NCR marketing men, David McIntosh and Martin Elliott. The company also offers software and staff selection services.

A BROKING service for users of scientific and industrial instruments has been set up by the instrumentation consultancy Gracey and Associates of Chelveston, Northamptonshire. Sellers give details of the equipment to Gracey, which sends the information to instrument users throughout the country. Potential buyers contact Gracey, which puts them in touch with the seller. When a deal is completed the seller pays Gracey 5% of the price.

A COUNTRYSIDE series of two-day seminars for first-time users has been organised by the DPMA, starting in London in October. Details are to be released shortly.

Firm wins its 50th TPS user

A LARGE order received by Telecomputing, of Oxford, for a turnkey system based on its TPS teleprocessing monitor, has set a landmark for the company, with the acquisition of its 50th TPS user.

The contract, worth almost £200,000, comes from W. Heffer and Sons, international booksellers, of Cambridge.

The company plans to install an ICL 2903 with three attached 7502 terminals carrying a total of 12 visual display stations. A further 7502 with four VDUs will be used for offline data entry.

The processor will also carry 32 K words of memory and two EDS 60 disc units. The main applications area of the system will be in helping to control Heffer's mail order business. The software will include some advanced features, such as TPS' directory access method, allowing multiple keys to the same file.

The contract will be handled by Telecomputing Systems, the associate company which covers the development of tailor-made TPS-based software. Scheduled completion date for the online system is next April, with the offline systems taking another month.

Telecomputing's 50th customer is a singularly appropriate one, since several Telecomputing staff came from B. H. Blackwell, international booksellers of Oxford. Bernard Panton, founder of Telecomputing, at one time headed Blackwell's DP department.

Breakaway by Texas users

USERS of the Texas Instruments 990 minicomputer have broken away from the main Texas users' association and formed their own group. They will hold their first big meeting at Aston University in Birmingham on September 20 and 21.

Short informal talks will be given on Mascot, the Algol and Coral development system; bubble memory; Coral 66; reliability; and the use of a 990 as a telephone exchange monitor.

Users who would like to talk on other topics should contact the organiser, Bill Davy, at the university.

Davy said the group had broken from the main users' association because 990 users tended to be hardware oriented, while the 960 and 980 were used more for process control and data processing applications.

Registration for the meeting costs £30, which includes lunch. Dinner costs £3 and accommodation £6 a night. Further details can be had from Bill Davy, Department of Electrical Engineering, Aston University, the Sumpner Building, 19 Coleshill Street, Birmingham B4 7PB. Telephone 021-359 3611, extension 6231.

Three sign for Nixdorf 8870

USERS of the Nixdorf 800 series of visible record and office computers are being wooed and won by salesmen of the much newer 8870 display-based small business system and its Nidos sales order processing and Comet financial ledger packages.

Three companies have just signed for the Nixdorf 8870. Nylonoc Engineering of Rickmansworth is replacing an 820/15 VRC with a two-display 8870; J. B. Rollings, confectioner, of St Albans, wants a three VDU 8870 to replace its current 880/45 machine; and Trox Brothers of Thetford will replace an 820/15 with a four-display 8870.

First Univac V77s in UK

THE first two Univac V77-400 minicomputers in the UK have been installed at Vernons Pools in Liverpool — just as the new football season started.

The two new minis were up and running within two hours of the crates arriving at Vernons' premises, in time to be used for checking coupons based on the first round League Cup matches 12 days ago.

Programming winners at ICL

Three students who should go far in the computer industry were shown round ICL's systems centre at Putney in south west London by John Skeffington (left) from the company's education region.

The three were prize-winners in ICL's programming competition for schools and colleges.

Winner of first prize was 19-year-old Neil Harland (at the back of the picture) who has just left Medway and Maidstone College of Technology. He used the college's 2903 to program the game Connect 4, in which the player manoeuvres four markers into a straight line on a grid.

Second was 19-year-old Elizabeth Pali, of Nene College in Northampton, also a 2903 installation. She produced a system which worked out a person's personality from questions.

Richard Williams, a 19-year-old from Westfield School in Wellingborough, Northamptonshire, was third. The school has a terminal linked to Nene College. Williams computerised the Nim game which involves taking a number of matches away from a set pattern, the winner being the one with the last match.

Govt doubles budget

ONE-THIRD of the 1977 budget of the government's Computers, Systems and Electronics Requirements Board is to be spent on work on the practical application of computers. The amount will be £3.4 million compared with £1.6 million, or 21% of the total, last year.

Research on computer applications funded by the board last year included speech recognition, man-person interaction and document retrieval. A further £1.7 million was spent on the standardisation of Coral 66 and work on networks and distributed databases.

Most of the work was done at government-funded institutions like the National Physical Laboratory, the Warren Spring Laboratory and the Computer Aided Design Centre. The board also funds work at the National Computing Centre.

The board is reviewing its funding policy and is considering giving more contracts to software companies (CW, May 5).

GILB'S MYTHODOLOGY

Just how true are the old truths?

Alternating each week with Professor Donald Michie's Private view will be a regular new Computer Weekly series, Gilb's Mythodology.

Tom Gilb, a past president of the Norwegian Computer Society, is an independent consultant, lecturer and communicator on a wide range of "computerware" topics. Recently he co-authored a book on humanised input* which has been described as "an absolute must for any serious professional systems designers."

Each fortnight Gilb will be giving practical examples either of a computer myth that needs exploding or of a good idea that could be implemented in a variety of systems.

In this first column, Gilb first gives a brief statement of just a few misconceptions in the data processing field, and an indication of what he believes to be the truth together with an example of a good idea — the use of the question mark facility in online systems.

In future, Gilb will be adopting a single persona each week — either a good ideas saint or a provocative debunker of computer myths.

THE sole purpose of this new series is to help the reader remove some of the cobwebs from his mind and free his or her intellectual resources for imaginative problem solving.

This means both clearing up misconceptions and giving guidelines on good practical ways of improving systems implementations.

To start with here is my instant reaction to a few computer myths:

Myth: Database languages help programmers program databases.
Gilb: They seem rather to introduce unnecessary complication.

Myth: Structured program coding increases program maintainability.
Gilb: Several scientific experiments and several large scale experiences have been unable to demonstrate positively the correlation.

Myth: GIGO, garbage in, garbage out, indicates that wrong results are the user's fault.
Gilb: GIGO is only true for poorly designed systems; wrong results are primarily the fault of the systems designer.

Myth: Numeric codes are cheaper, faster and preferred for computers.
Gilb: Numeric codes which are unnatural increase the cost, time and unreliability of your data processing.

Myth: Database software saves us the effort of writing database logic ourselves.
Gilb: Database software seems to increase all costs and problems because of complexity.

Myth: Experienced programmers can judge the value of new programming techniques.
Gilb: Maybe some can but systematic experiments which measure both productivity and programmer opinion about productivity raise serious doubts about the human ability to judge one's own productivity.

Myth: Program maintainability is not measurable, it is inevitably uncontrollable.
Gilb: Program maintainability is quantifiable, measurable and you can put it in a contract.

I will be returning to these and many other myths in more detail in future columns, but I now give you a summary of my Future Shock principle so that you can find your own mythodology: **In our rapidly changing world, the old truths might always have been untrue, or have become untrue or will become untrue for your particular case.**

And now, to show that I can be sweet as well as a bit sour, here is the first of my good ideas. It concerns the use of the question mark facility.

The basic idea is that the user of an application, who is online via a terminal is allowed to ask for help by simply writing a question mark (?), at any point in the interaction.

The program must then give him an overview of his options at that particular point in the program. The program might summarise what it has understood of the user requests thus far; this is particularly important when the user is allowed to give indirect references, symbolic references and data which is automatically corrected by the program if slightly incorrect. The program can follow with a simple summary of the available key words which the user can give.

The system might be programmed to supply even more extensive explanations if the user again replies with a "?" (or as I usually designate it a "??").

The first time I saw something similar to this was in the "HELP" facility of Basic. The most explicit popular version is to be found in Digital Equipment's software in the DECsystem 20, where this facility is available for programmers who have not yet memorised the job control parameters.

In one sense the "?" facility is a way of building the entire "user handbook" into the computer system. There was a time when the ratio of human and machine economics did not encourage this sort of systems design.

The computer itself might have presented obstacles such as a limited primary memory and limited ability to page or segment program logic in from secondary memory. It was then natural that users were given a handbook and a course in using the system.

Today's economics and facilities — not to mention tomorrow's economics, which must be considered in design work of today — not only allow us to build the handbook into the program, they demand such designs.

DEC have understood the principle, they have implemented it because they want their system to be preferred by users, and they want to make their system "more convenient" than the competition. I wish them well and hope they embarrass IBM and the others to follow suit.

Machine size should be no limitation. I have already applied this design principle to microcomputers with floppy disc backing store. Perhaps we need it more than ever as we attempt to spread cheap interactive computer technology to even greater masses of non-professional terminal users.

I have long held, even for batch systems, that the need for user handbooks was a sign that the system itself was not well designed. Systems design must be highly "humanised" so that it is naturally easy to learn and to use.

The question-mark design specification is but one element of a humanised system, but I think it will prove to be a powerful idea.

It will demand a lot of extra program code, but the effort of writing this code is about the same as the "handbook" effort. The logic itself is only needed in primary memory on an exception basis, and this should cause little or no economic demands on the computer in operation.

On the contrary, the system itself will probably be more economically utilised when people get help to use it fully and correctly.

I will be back in a fortnight's time taking a look at the question of whether database languages help or hinder programmers.

*Humanised Input, Tom Gilb and Gerry Weinberg. 276pp. £11.20, Winthrop, available from Prentice-Hall International.

Canadian takes advantage of Irish grants

A CANADIAN software house and bureau has taken advantage of the industry grants offered by the Republic of Ireland government and set up a software development office in Cork.

The company, Comtech, is using the move as an opportunity to expand from its present business of offering accounting packages on mainframes, [illegible] produce turnkey systems handling applications ranging from order entry to marketing information. The systems will be based on Digital Equipment minicomputers.

But the new systems will not be available in Europe. They will be exported back to Canada and the US for sale there. Comtech has only a small presence in [illegible] Europe.

Its accounting packages are sold in Ireland and the UK by the Aer Lingus subsidiary Cara Consulting and it is only just starting to look at possible agents in France and Germany.

By exporting all its work to North America Comtech will get the full benefit of Ireland's [illegible] offers to foreign companies. For in addition to getting training and accommodation grants, companies which export all their products pay no tax.

Comtech is employing local staff and has taken on six people. It is only the third software company to set up office in the Republic, the others being the UK firms Altergo and MSP.

SOFTWARE FILE

Original structure of Sharp database

IDEAS are beginning to firm up on the database management system being planned by I. P. Sharp Associates (CW, March 3). Although no final outline has yet emerged, internal documents show the probable evolution of a highly original relational structure, interwoven with the APL language.

APL is noted for its unusual and powerful functions and for the absence of data-type specification in the program. These factors make its handling of data unconventional. The first APL file system had an entirely novel organisation, though interfaces have since been produced for conventional files.

The relational schema allows a central "data model" to be established, consisting of data items and relations between them. A relation could for example, specify which of a set of account numbers is associated with which of a set of customer names. A user's view of the data will usually be a "sub-model," involving a subset of the data items and their relations.

One of the most novel ideas for the Sharp database is to investigate the possibility of allowing a user to refer to relations, or even data items, not present in the central model. The sub-model would include definitions of the way in which new items and relations are connected with those already in the model.

Such a facility is believed not to be available in any current relational database.

Other suggested features include a command interpreter, which would allow commands to be expressed in an APL-like source code and translated into database commands. This would allow closer integration with the language, and could, in turn, lead to extensions to APL itself.

Some of these suggestions have already been implemented in simulated form. Chairman Ian Sharp stressed, however, that they are still only initial ideas. The eventual database, which may not appear for another year, need not implement all of them..

Mark IV sales up 200% outside US

IN its 15th year of business Informatica, chiefly known in the UK for its Mark IV Information management system, has reported a markedly increased turnover. An important contribution to this expansion, says the company, is an increase in Mark IV sales outside the US.

Informatica, not being a public company, is not obliged to produce an annual report, so the published figures are a less than detailed account and include, in particular, no explicit profit figures.

Profits for 1976 were "modest," says the company, but this was in accordance with a five-year plan.

Turnover worldwide has increased by more than 50%, from $39.4m to $59.3m; but sales of Mark IV outside the US have grown by 200%. This resulted chiefly from ventures into new areas, including South America, South Africa, Australasia and Japan, said a spokesman.

He also admitted, however, that 1975 had been a relatively bad year, accenting the growth of 1976.

Besides Mark IV and the production control package Production IV, its prime products in the UK, Informatics handles a variety of consultancy work. In late 1975, it took over a range of software and services from GTE, including the Intercomm and Minicomm teleprocessing monitors. These are also proving increasingly profitable, said Informatics' chairman Walter Bauer.

Puzzler

NEXT time you take the family for a drive, get one of the passengers to try out this week's problem in practice, with paper and pencil:

Jot down the numbers (not the letters) of passing cars, but ignoring those with four letters. How many entries on average will be made in the notebook before the one number is duplicated? In other words, at what stage does the chance of a duplicate arising become better than even?

See page 39 for solution.

Finns first in Europe to install Total

THE version of Cincom's Total database management system for Interdata 32-bit minicomputers (CW, June 2) has been officially released in the UK and Europe, and has gained its first European user, Finnish software house and bureau Systek Oy.

The company, based in Helsinki, was formed from the DP department of Finland's largest bank. Its position as Interdata's Finnish distributor should lend weight to Interdata Total's sales campaign in Finland.

Systek is equipped with both an Interdata 7/32 and an 8/32. Total will be offered to the company's bureau users including the bank.

Interdata Total already has two US users, Interdata itself and a university.

EDITED BY STEPHEN BELL

Cullinane lands worldwide ITT order

THE growing interest of Cullinane Corp in software for auditing has been repaid with a large contract. The communications giant ITT has requested copies of Cullinane's EDP-Auditor software for 35 sites worldwide.

The software will be run on IBM equipment and will be used both for data sampling to aid auditing and for general-purpose data retrieval.

Such automation of auditing procedures is growing in popularity in the US; and, with increasing consciousness of computer security problems, the UK is likely to follow this trend.

Cullinane has had EDP-Auditor for several years, but it has, in the past, been a minor interest and not widely sold. Earlier this year, Cullinane showed a growing interest in auditing by acquiring US company Computer Audit Systems.

EDP-Auditor has a simplified interface, using parameters, to ease use by accountants and other non-DP-oriented staff. UK agent for the package is Computeristics, of Edinburgh.

MSP reveals plans for test data pack

TEST data generation, a comparatively neglected area in the software products world, is the latest application to be approached by Management Systems and Programming. Generation software is now definitely scheduled for release at the end of next year, the company confirmed.

"For a long time, a test data generator has been on our price lists with a note, 'to be announced' ", said Richard Struck, MSP's product development manager. "In the next list, we will be able to give users a definite date."

As far as progress on development is concerned, the product has "reached the discussion document stage," said Struck. In MSP's development strategy, the discussion document is formatted once initial ideas about the product are clarified within the company.

The document is circulated to interested users for any additional suggestions before development work starts.

The test data generator will not be a separate new product; but will, rather, be sold as a module of MSP's existing Datamanager data dictionary.

Since the data dictionary can be used to generate appropriate data definition modules for inclusion in source programs, it is only a small step for it to generate actual files.

A future version of the test data generator could also form a bridge from Datamanager into MSP's other major product, the Testmanager program module testing harness. At present, the generator is intended to produce input files for complete programs, but it should be easy to alter it to produce suitable streams of input data for single modules.

MSP plans that its generator will be able to produce single files with appropriate mixes of valid and invalid data, as well as co-ordinated sets of files.

It could, for example, produce a master and transaction file with a proportion of transactions with no corresponding master record and masters with no corresponding transactions.

Some products for test data generation are already produced, perhaps the best known in the UK being Series J, developed by Michael Jackson Systems, and marketed by Business and Technical Systems. US and Swedish products also exist.

The attachment of such an aid to an already popular software product could possibly act as a stimulus to acceptance of the technique.

Cincom and NCR in link-up over Total

TAKING a role as standard database product in yet another hardware manufacturer's repertoire, Cincom's database management system has been adopted for worldwide marketing by NCR, on its Century and Criterion ranges.

The NCR implementation of Total was developed three years ago by Cincom, for NCR's own internal use (CW, May 2, 1974). The two companies made an agreement for NCR to market the version to outside users within the US, while Cincom handled the rest of the world.

Under the new agreement, NCR and Cincom will sell the software alongside each other, but will not compete. For every sale which NCR makes, Cincom will be paid a royalty, and for Cincom sales, NCR will receive a "finder's fee".

Total has already been adopted by Honeywell and CDC as a standard product, in spite of the fact that Honeywell has a DBMS of its own and one acquired from Rank Xerox, and CDC has its own system at present under development.

NCR, however, has neither a current system nor any plans for one. It intends to rely for the foreseeable future on Total. This policy will have the advantage of bringing NCR users the most widely used DBMS in the world, but will also, of course, simplify any conversion which these users might subsequently decide to make from NCR to one of the thirteen other manufacturers on whose machines Total is available.

Also covered by the NCR-Cincom agreement is NCR-Query, a high-level language for online data retrieval from Total databases. This product was also developed by Cincom for NCR last year.

PROGRAMMER NOTES

Benefits of a more scientific approach

A GREAT deal of discussion among the software experts at the IFIP 77 conference was devoted to various aspects of developing "reliable" software. As with many such debates, one wondered how remote such academic deliberations were from the world of the day-to-day programmer.

The larger software houses are beginning to apply some of the techniques lumped under the buzzword heading "software engineering," in their larger projects; but quality assurance of programs as practised in the average installation would probably astonish the learned speakers of IFIP.

A variety of topics was covered, ranging from formal mathematical proving of the validity of programs, through accurate determination of the thoroughness of testing, to the rather more nebulous analogies frequently drawn between software and other disciplines like engineering.

It would be useful to estimate how far the average computer user lags behind what is supposedly "the state of the art" in these topics, and the reasons for this gap. The first accounts of structured programming came in the early 1960s, but the technique is only now beginning to be adopted — often in strange variations — by users at large.

Such comparatively esoteric topics as program proving and "bebugging" — insertion of deliberate bugs to assess the rate of removal of genuine faults — seem barely to have penetrated the programming world in general.

Are the more adventurous techniques destined to emerge into the general DP environment eventually, leading to a new type of programmer, with perhaps a heavier bias towards the scientific and mathematical outlook?

Do you feel that programming would benefit from a change to a more scientific approach, or to a view more in common with engineering? Can the example of any other established disciplines prove of benefit to programming; or is it a unique field of endeavour, demanding entirely new techniques?

Programmers may not have delved deeply into the latest mathematical advances in their craft, but they are not short of ideas for improving existing programming languages (Programmer Notes, May 26 and July 28).

The latest suggestion comes from Tim Martin, of London N10, who proposes a "delayed write" command.

Many applications require a number of records to be written to the same file during a single transaction. It would clearly be convenient to write each record immediately after it had been formatted, but, Martin points out, an abnormal condition relating to one record (for example an item out of stock on an order) may require that the whole transaction be cancelled. To allow for this, the interim records must be stored in work areas and written at the end of the transaction.

The "delayed write" would enable the write commands to be placed in the program after the formatting of each record. "The program would continue as if a real write had occurred, except that actual writing would be delayed until the program issued an 'action' command. If, instead, the program issued a 'cancel', all current delayed writes would be forgotten."

This would certainly appear to improve program clarity, though, as Martin admits, it could increase run-time and memory occupancy.

What is other programmers' reaction to this idea? Does anyone have any other interesting suggestions?

Microprocessor News

Intel announces kit based on 8085

A DESIGN kit, based on the 8085 microcomputer and aimed at both the systems prototyping and experimenters' and hobbyists' markets, has been introduced by Intel.

Known as the SDK-85, the kit is primarily aimed at engineers as an evaluation tool for the 8085 device. However, as the kit comes complete with an on-card, 24-key keyboard input and a 8-digit, 7-segment LED display output, it could prove an ideal starting point for the hobbyist.

The kit contains a 1.3 microsecond cycle time 8085 CPU chip, an 8355 2K byte program memory which contains the system monitor, and two programmable I/O ports. Also included is an 8155 which, in addition to providing 258 bytes of read/write memory, also adds a programmable 14-bit timer and a further two programmable I/O ports. A new chip, the 8279, is used in conjunction with two 8205, one of eight decoders to provide direct interface to the on-card keyboard and display.

To allow for further expansion of the system by the user, the kit is equipped with a large wire-wrap area for external connections, together with a provision to accommodate a number of additional circuits. For example, an extra 8155 and 8355 can be added to double the on-card program memory, read/write memory and parallel I/O capability. Type 8212 and 8218 bus drivers can also be added if off-card bus driving is required.

The keyboard has 18 hexadecimal keys, four of which are dual purpose, and eight of which are special function, offering such facilities as vectored interrupt, single-step, go, substitute memory and examine memory. The on-card monitor provides a number of general purpose utilities and supports the keyboard/LED I/O, in addition to a teletypewriter. This can be driven via a serial port implemented using the SID and SOD lines of the CPU chip with software generated timing. The port is set for a 20 milliamp current loop and 110 baud transmission rate to enable direct connection.

One of the kit's most important attractions, especially to the potential hobbyist, is the price — £187.

Two courses offer hands-on experience

THIS week brings news of two more microprocessor courses offering practical hands-on experience.

Limrose Electronics is offering a range of intensive, two-day workshop courses based primarily on the Intel 8080 and Motorola 6800 microprocessors. Each participant is equipped with a microcomputer for the duration of the course, which is aimed at providing basic experience in hardware, software and interfacing. Further information can be obtained from Limrose at 241-243 Manchester Road, Northwich, Cheshire.

● From 12-18 September, the Electrical Engineering Department of Aston University will be running a course and workshop on the Texas Instruments TMS 9900 microprocessor. Aimed at giving progressive instruction on this 16-bit device and its associated equipment, it starts with a one day introduction, continues through the next two days on the hardware and software, and ends with two days of hands-on experience.

Low-cost system around Z80

A LOW-COST general purpose business system configured around the Zilog Z80 microprocessor, is to be unveiled at the Compec exhibition in November by DP National Appliances.

The company is looking for software houses to develop packages for the system and also to sell it.

DP National Appliances also sells the General Automation TOM system, but decided to develop its own less expensive and more versatile screen-based system using a microprocessor.

The Zilog Z80 was chosen because it can run Intel 8080 software while enabling circuitry to be built round it with a faster cycle time than with the Intel chip.

The basic configuration of the system, nameless at present, will cost £8,000 for which the purchaser will get a processor with a 18K byte memory, one 1920-character VDU, a Centronics 701 80chps printer and two 256K byte floppy disc drives, all housed in modular office furniture.

Arithmetic logic unit

A 4-BIT parallel arithmetic logic unit capable of providing 16 binary arithmetic operations on two 4-bit words and 16 logic functions of two Boolean variables is available from Mogul Electronics.

Known as the CD40181B, the device is manufactured by RCA Solid State for which Mogul Electronics acts as distributor. It is aimed specifically at applications in process controllers, parallel arithmetic units and low power minicomputers and contains the necessary logic for full look-ahead carry operations, enabling high-speed arithmetic operations to be carried out on long words.

Four select inputs are provided which choose the desired logic or arithmetic functions including AND, OR, NAND, NOR, exclusive OR and exclusive NOR in the logic mode, as well as, addition, subtraction, decrement, left-shift and straight transfer in the arithmetic mode.

Programmable timer

SOFTWARE controllable time intervals for applications such as frequency measurement, event counting and gated delays are now possible with a single hardware module, the Motorola MC6840 programmable timer.

The module consists of three independent programmable 16-bit binary counters which can be used with clock frequencies up to 1.5MHz, and 4MHz on the third counter. Programming of the device is carried out through the databus, and this operates a variety of timer modes, such as, a single shot or continuous mode for time intervals and/or gate duration measurement.

NEW TELETYPE 33 ASR

T.E.

UNDER £1,000 DUTY PAID plus delivery and VAT. Still the most popular, economical, reliable and versatile terminal. Delivery 4 weeks.

Also rental and after sales service.

Teleprinter Equipment Limited, 70-80 Akeman Street, Tring, Herts HP23 8AJ. 0442 82.4011 (7 lines), or Telex 82362.

PROFIT FROM YOUR COMPUTER WASTE

by contacting London's BEST BUYERS
DATAWASTE LTD
98 Wakeman Road
Kensal Green
London NW10 5DH
01-960 1000

---

tectonics guarantees

12 MONTHS FREE SUPPORT

on all development projects, from one-off programs to major systems.

contact Terence Salmon ORP 29[illegible]
Tectonics Ltd [illegible]

The fixed price fixed time specialists

CRB

A Computer World Trade Company

COMPUTER RESALE BROKERS INTERNATIONAL LTD.
Queen's Hse, Holly Rd, Twickenham, Middx TW1 4EH. Tel: 01-891 0731. Telex: 935122

FOR SALE

Two Plessey ID 33 Incremental Magnetic Tape Readers

In good working order. Also two identical readers suitable for dismantling for spares. All with interfaces to drive Linotron 505 photosetters.

Offers to W. E. MILES
Company Technical Adviser
Portsmouth & Sunderland Newspapers Ltd.
5 The Precinct, London Road
Waterlooville, Hants.
PO7 7DT
Tel. Waterlooville 57151

WE BUY COMPUTERS

of all kinds, including BCL, Burroughs, Friden, Flexowriters, Kienzle, NCR, Nixdorf, Olivetti, Philips, Singer, Logabax, etc., etc., etc., etc.

EOB EQUIPMENT LTD.
BCM Box 678, London WC1V 6XX
01-404 5011

FOR SALE

Burroughs 8500 Computer

With 18 2K core

- 3 Station mag-tape unit
- 58 Megabyte disc unit
- 1200 Lpm printer
- 800 cpm cardreader
- 200 cpm cardreader
- 3—TC800 terminals
- 1—console printer
- 3—Papertape punches and readers
- JUKI 80 column card punches
- 2—Hand punches
- Card Cabinets
- 10—V24/20 mAmp convectors

Contact:

Sipher Designs (Electronics) Ltd.
Unit 3, Chiltern Trading Estate
Holmer Green, High Wycombe
Bucks.
Tel. Holmer Green 5E17

FOR SALE

Moore Reed mini-port teletype with acoustic coupler (ASKI code).
£1,150

Wilkes "4-part" decollator.
£825

WDP Call: 01-464 9011

WANTED

I.C.L. 1901/1A System with magnetic tape.

Please send details to:
Mrs. S. Smith
22 St. Helens Close
Grantham, Lincs, or
Phone 0476-67924

---

tap

IBM COMPUTER TIME and Bureau Services Central London Attractive Rates

PHONE
01-836 0355
01-242 9283

Time and People Limited

IBM 029 A22 Printing Punches

For sale on IMMEDIATE delivery
IBM 029 A22 Printing Punches
IBM 3336 Disk Packs
contact Jo Yates on 021.704 2655
CPS Brokers Ltd.
Serck House, Solihull, B91 3DG

NELSON COMPUTER SERVICES LTD.

BUY & SELL

COMPUTER SYSTEMS — ICL / IBM / DEC / BCL
DATA-PREP EQUIPMENT — ICL / IBM / UNIVAC / KODE / TELETYPE
BURSTERS/DECOLLATORS/GUILLOTINES
D.P. STORAGE CABINETS (inc. FIRE PROOF)

FOR SALE

- 1 UNIVAC 1710-UIP £2 500
- 1 A Frame Decollator £225
- 1 3 Part Decollator (as new) £800
- 1 Mini Burster £250
- 1 WILKES Guillotine £475
- 2 KODE VIP 80 £2,800 each

FOR FURTHER INFORMATION CONTACT
St. John's Court, Rawtenstall, Lancs BB4 7PA. Tel. Rossendale (07062) 29128

IF YOU REQUIRE CONTRACT STAFF

[illegible] specialists (since 1968)

OPERATORS

[illegible]

PROGRAMMERS

[illegible]

ANALYSTS

[illegible]

Give for those who Gave

Thousands of men and women who served in the Royal Air Forces have given their health or even their lives in the defence of Freedom and many of them or their dependants are now in need of help.

Please assist by giving all you can for an emblem during WINGS WEEK or please send us a donation.

PLEASE WEAR THIS EMBLEM DURING

Wings Appeal
In September

Royal Air Forces Association, 43, Grove Park Road, London, W4 3RU.
(Incorporated by Royal Charter and registered under the War Charities Act 1940 and Charities Act 1960).

TELEPRINTERS — 120 CPS

- ★ Available in KSR and ASR versions.
- ★ Switch selectable speeds up to 120 cps.
- ★ ASCII/APL keyboard.
- ★ Options include Vert/Hor Tab. FIFO Buffer etc.
- ★ Nationwide Sales and Maintenance.

Area Sales Tel
Midlands 021-459 6969
Scotland 041-221 6781
Wales Chepstow 2193

DATA DESIGN TECHNIQUES LTD.
5 Watkin Road, Wembley, Middx.
Tel. 01-903 6977

ELECTRONIC BROKERS LTD

NEW 80 Column Hand Punch

- *Aluminium machine bed
- *Tool-steel punch block
- *Built-in chip tray

Send for Brochure

WE BUY WE SELL

SCOOP up to 45% OFF HAZELTINE

Teletype-compatible CRT Terminals

HAZELTINE 1000
960 Characters.
full/half Duplex
New List price £900.
OUR PRICE £525

HAZELTINE 2000
1998 Characters. Editing.
full/half Duplex and batch mode
New List Price £1648.
OUR PRICE £995

HAZELTINE 1200
1920 Characters.
full/half Duplex
New List Price £841.
OUR PRICE £725

All units factory - refurbished to as-new standard and covered by 90-day warranty. All prices subject to carriage and VAT.

- ★ 12" Diagonal Screen
- ★ TTY Format Keyboard
- ★ 64 ASCII Character Set
- ★ 5x7 Dot Matrix
- ★ Switch-selectable Transmission and Parity
- ★ Standard CCITT V24 Interface

ELECTRONIC BROKERS LTD. (Computer Sales & Services Division)
49-53 Pancras Road, London NW1 2QB Tel: 01-837 7781
TELEX: 298694

FOR USED DP EQUIPMENT
BUY OR SELL THROUGH WDP 01-464 9011

NEW DE LUXE 80 COLUMN PUNCHES WITH SKIP OR NON-SKIP OPTION
A/N KEY TOPS, CHIP TRAY, WRECK KNIFE, DUST COVER. MAINTENANCE AVAILABLE FOLLOWING 1 YEAR GUARANTEE PERIOD

WDP 01-464 9011
WEBSTER D/P SERVICES LTD.
165 WIDMORE ROAD, BROMLEY
KENT BR1 3AA

For Advertising Rates
PHONE 01-261 8757

CoOperators
A VLI COMPANY
supply first-rate contract operations staff for long or short term needs -FAST
RING NOW 01.836 8411

CDL for IBM DATA PREPARATION EQUIPMENT

Brokerage service for used Computer and Peripheral Hardware
FOR ADVICE ON
BUYING-SELLING or MAINTENANCE
Call 02774 58028/9
Commercial Data Ltd
2 Holly Court, Billericay, Essex

COMPUTERS—PERIPHERALS ETC.

IN — OUT

WE BUY — WE SELL
HARD CASH — COMMISSIONS
Scopes, Test Gear, Anything considered.
Phone: READING (0734) 586419
7/9 Arthur Road, Reading

Contract Operators, Programmers, Key Punch Ops.
phone 491 4706
Knight

KEY OPERATIONS ASSISTANCE LTD

CONTRACT

★ OPERATORS ★
★ PROGRAMMERS ★
★ PUNCH OPERATORS ★

LEADING SUPPLIERS OF CONTRACT OPERATIONS PERSONNEL THROUGHOUT EUROPE

SAVE TIME AND MONEY
CALL US FIRST

01-493 6696
01-499 1787

EUR/OPS EUR/OPS

4 HALF MOON STREET, LONDON W1Y 7RA

WANTED

Secondhand electronic equipment of the following types:
D.E.C. PDP8Ms, PDP8As, VK8Es and VK8As.
I.T.T. (S.T.C.) ADX6800 Systems.
Please ring 01-353 6060 Ext. 57 with full details of equipment with price, etc.

SIMKISS COMPUTER SERVICES

CALL GERRY SIMKISS ON 072-98 348

UNIVAC for sale
Terminal Multiplexor with 2 Uniscope 100's & Hard Copy Printers.

ICL for sale or hire.
7502/3 Terminal Processor with 3 VTU's and 1 Hard Copy Printer.
7181/4 20 Local VDU's with Control and Expansion Unit
2025/5 1902S CPU with 32K Core and SCF.
2102/1 300 cpm Card Reader
2402/2 600 lpm Line Printer.

ALL THE EQUIPMENT IS ELIGIBLE FOR CONTINUED MANUFACTURERS MAINTENANCE

WANTED:
OLD COMPUTERS
J. & M. COMPUTERS
47 High Mead
Rayleigh, Essex
Rayleigh (0268) 742851

We have a variety of used computer and peripheral spares and we would like to purchase old ICL 1900 Systems. We will dismantle and collect from any site in the UK.

LISTING PAPER FOR SALE

Limited quantity of 12" deep, 17$\frac{25}{32}$" wide, 2 part carbonless £11 per 1,000 delivered, min. 10,000. Discount on large quantities. Single part £8.

E O B EQUIPMENT LTD.
BCM Box 678, London WC1V 6XX
01-404 5011

OPERATORS KPG PROGRAMMERS KPG KEY PUNCH OPERATORS KPG
SUPPORT SERVICES YOU KNOW YOU CAN RELY UPON
KPG Ltd 28 THE BUTTS BRENTFORD MIDDX 01-568 7345

REAL-TIME DESIGN CAPACITY
SOFTWARE DESIGN AND COMMISSION PDP11, 8080
HARDWARE AND MANUFACTURING SUPPORT

Substantial research development and engineering division of systems and product manufacture and design resource capacity. Suitable industrial control application. Mechanism and electronic design capacity. Competitive terms.

Ring CLIFF OSBOURNE, Eng. Manager, WATFORD 44300.

NELSON COMPUTER SERVICES LTD.
have FOR SALE
an UNUSED PDP 1104 . . . 64K6
2 x 2.4 meg cartridges
1 x 150 cps printer
2 x beehive VDU's . . . RSTS4
Telephone Rawtenstall
(STD 07062) 29125

FOCUS computer services limited

CONTRACT or PERMANENT—
ANALYSTS - PROGRAMMERS - OPERATORS
PUNCH OPERATORS - DATA CONTROLLERS
Tel. 01-487 5781 28A Devonshire Street - London - W1.

HEXAGON computer services
[illegible]-3671
145 WARDOUR STREET, LONDON, W1V 3T[illegible]

Contract & Perma[illegible]
Total DP Supp[illegible]
Programming [illegible]
Data Preparation [illegible]
Data Control [illegible]

PEOPLE

Reclaiming talents of disabled

THE BCS has been concerned for a long time with the special position of its disabled members. Now the Sussex branch of the society is holding a seminar on the subject, in Brighton, entitled The Talents of the Disabled.

The computer industry is growing all the time, and there is always a need for new sources of suitable human material to train as computer staff. The seminar aims to show how in many cases the disabled are well suited to fulfil this need.

The seminar will be followed in the evening by the branch meeting at which Ray Atkinson will talk about the work of the Central Computing Agency.

Entry to the seminar, which will take place at 2pm on October 12 in the Old Ship Hotel, is free, but the number of tickets is limited to 150 so you are requested to apply in advance, to the BCS, 11 Windover Crescent, Lewes, Sussex BN7 1OP.

Tony Armstrong, latterly sales manager with Digico, has joined MBM Computers in the same capacity and will be based at MBM's Northampton HQ.

John Parker of James Wilkes has been promoted from personal assistant to the sales director to marketing manager of the business forms division.

Peter Buck, managing director of Westrex Ltd and executive vice-president of Westrex International, has been appointed president of Westrex International.

Keith Hocking, marketing manager at BIS-Deltak, has been appointed marketing director.

Stephen Rothero has joined OCLI Europe, sales and marketing division of Optical Coating Labs, as a sales engineer. He was formerly a library assistant training as an information officer with Maidenhead Central Library.

VISITING ICL's Kidsgrove factory, David Knox, MP for Leek, Staffs, is seen chatting to quality control manager Sadra Nanji and Julies Herea, who operates a tester for integrated circuit components.

Death of R.G. Ruppli

R. G. Ruppli, the president of Supertyper UK, died in a car accident this month. The accident occurred when he was on his way home from a business trip in Hungary. He was 49. He leaves a wife and two children.

Tokunbo Nzegwu goes to Redifon Computers as territory manager for the Surrey and South-West London area. He was formerly consultant design engineer with EMI Medical's brain scanner division.

Jim Tyree has been made sales and marketing director with CMES (Software). He was previously head of special projects with Marcol.

Jobs Farmer, latterly general manager of the data product division of Magnetic Components Ltd, has been made marketing director of the company.

David Everard has joined Logabax as London regional sales manager, from Adler Business Systems where he held a similar position.

Carl Peterson has joined the commercial memory products division of Electronic Memories and Magnetics (EMM) in California as marketing manager. Previously he was key account manager for Data 100.

Les Bruoton at Tektronix has been promoted from service administration supervisor to field engineer. He will specialise in Telequipment products in the North and West London and Home Counties area.

Graham Menzies, previously US customer support manager with Computer Audit Systems Ltd, has joined Computel as a senior sales executive.

Software Sweeties

THESE are the Software Sweeties from the Redifon Computers software development team, seen at the Redifon Gala, held each year for employees at the company's sports ground. The Sweeties showed that their talents were not restricted to programming by winning the It's A Knockout Cup, for which they were required to excel in such events as Human Camel Racing, Egg Throwing and a Space Hopper race. They also produced, at the appropriate moment, their own Joker, designed and painted by John Wood (left of pic). Other team members are (left to right) Ron MacRae, Nick Kotarski, Cheryl Houlind and Alan Brown.

Registration for BCS exam courses

REGISTRATION for the BCS exam courses, Parts I and II, and for the HNC in computer studies/mathematics, statistics and computing will take place at Slough College of Higher Education on September 7-8.

Further details may be obtained from Dr E. Huzan, Head of the Computing Division, Slough College of Higher Education, Wellington Street, Slough SL1 1YC, tel: Slough (75) 34585, ext 5.

Soccer

DATASCENE clinched the division two championship in the Sumnior Computer League last week by beating Reuters 5-0. Datascene has scored 14 points from seven games and in its last match meets Time Sharing. Xerox, with 12 points from eight games, looks certain of going up to the first division although it can still be caught by Time Sharing, which has three games to play.

Altergo has all but clinched division three with a 14-1 win over BIS. ICL needs to beat British Rail by 20 goals to win the championship. Both Altergo and ICL are assured of promotion. Gryphon still leads division one, but Jadpu is only two points behind and has two matches in hand. The situation is also very close at the bottom of division one, and any of six teams could still go down

Latest results and league tables

Division 1

London Transport 5, Computing 0

	P	W	D	L	F	A	Pts
Gryphon	6	5	0	1	45	5	10
LT'spt	7	4	1	2	24	14	9
Jadpu	4	4	0	0	38	9	8

Division II

Datascene 5, Reuters 0
Time Sharing 5, Reuters 0
Xerox 5, Reuters 0

	P	W	D	L	F	
Datascene	7	7	0	0	40	[illegible]
Xerox	8	5	2	1	31	[illegible]
Reuters	8	4	0	[illegible]	22	[illegible]
Chor Wkly	6	3	1	2	18	[illegible]
Time S'ing	6	3	0	2	21	[illegible]
Extel	6	2	1	3	18	[illegible]
Southgate	6	2	0	3	14	[illegible]
Lambeth	5	1	0	4	[illegible]	[illegible]
Line Printer	8	0	0	8	6	[illegible]

Division III

Altergo 14, BIS 1
Altergo 4, British Rail 1
ICL 3, Airfix 1

Top positions

	P	W	D	L	F	
Altergo	8	6	2	0	62	[illegible]
ICL	7	6	0	1	28	[illegible]
JM	6	4	1	3	21	[illegible]
Control Data	6	3	1	2	24	[illegible]

Soccer dance. — Watch this space next week for news of the supers dance at the end of September. If you can't wait phone Danny Bor on 01-240 3223.

DIARY

SEPTEMBER 6-9
Compcon 77 — micros, minis and maxis. IEEE (USA). Washington, DC.

SEPTEMBER 7
Developments in micropublishing seminar. Microfilm Association of Great Britain. Oxford. Details: Executive Secretary, MAGB, 9 High Street, Guildford GU2 4AJ.

SEPTEMBER 7-8
Registration for BCS exam courses, and HNC in Computer studies. Slough College of Higher Education, Slough. Details, Dr E. Huzan, tel: 75 34585, ext 6.

SEPTEMBER 7-9
Symposium on data analysis and informatics. Institut de Recherche d'Informatique et d'Automatique. Rocquencourt, France.

SEPTEMBER 8
Database management, focus on user experience, seminar. BCS. Holiday Inn, Birmingham, 9.30.

SEPTEMBER 8-9
Meeting. IBM Computer Users' Association Programming Group. De Vere Hotel, Coventry.

EARLY WARNING

SEPTEMBER 14-16
Society for Management Information Systems, annual conference, Dallas, USA
Details: SMIS, SUITE 2028, 221 North LaSalle Street, Chicago, Ill 60601, USA.

SEPTEMBER 15
Vandalism, sabotage, it couldn't happen to us — the security aspects of operations. BCS Operations Group. Polytechnic of Central London. 16.00.

SEPTEMBER 19-22
Applications of numerical software conference. Institute of Mathematics and its Applications, Southend. University of Sussex, Brighton.

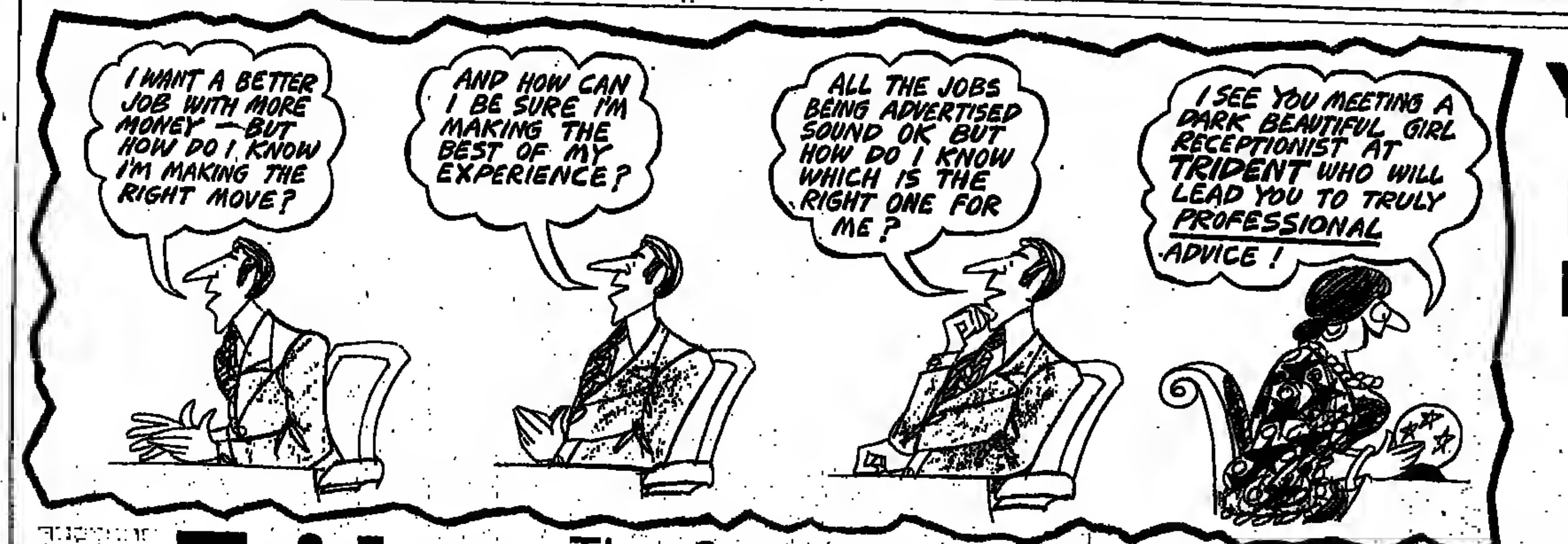
SEPTEMBER 19-24
SAMA 77, Salon International de la Production Automatisée. SAMA Hotel, Berne, Switzerland.

SEPTEMBER 26-28
Distributed computer control sy — international conference. IEE, Birmingham.

SEPTEMBER 27-30
Annual conference, Operational Research Society. The Queen's and [illegible] Colleges, University of Oxford.

SEPTEMBER 28
Computer access to large data using alternative store technologies. Graves, Peter Waterworth, Roy Bor. BCS Information Retrieval Special Group. City University, London. Tickets £1 from Pauline Walker, BCS, tel: 01-637 0471.

OCTOBER 3-5
Computer application in medical — symposium. IEEE Computer So ty/Medical College of Virginia/Geo Washington University Medical Ce Washington, DC.



LETTERS

An area where UK has a world lead

I REALLY must take issue with some points you reported from the Hedsor Workshop on computer related R & D (CW, August 4). To suggest funding further development of system software rather than computer related semiconductor devices because "it is probably too late for Britain to develop any major semiconductor manufacturing capability" is not only uninformed but sheer nonsense.

It is in precisely this area that the UK has a world, yes *world* lead, with a wholly British designed 16-bit micro, diffused in the UK, using a simple, high yield. LSI, bipolar process. Further, the funding for the development of this device and other members of its family has been from government sources. These devices and other products ideally suited for computer applications are now reaching the marketplace with some success.

This is hardly a case of "too much pure and misdirected R and too little practical and successful D" nor does it comply with the "conceived in Britain, made elsewhere" pattern.

Not only has the funding resulted in a highly competitive chip set, but more importantly the process, design and development expertise necessary to achieve this goal now resides in the UK.

If you are still wondering where the action is, the 16-bit micro is the F100L, the bipolar process is CDI and the company is Ferranti.

A. M. COX
Electronic & Display
Equipment Dept.
Ferranti.

Prolonged viewing risks

I NOTED with interest the Op Spot column dealing with prolonged viewing of VDUs (CW, July 21).

I am currently working for IFRA, the international newspaper research association in Darmstadt, in order to establish exactly what the potential risks are. This study will take one-and-a-half to two years and is being conducted in collaboration with the University of Paris, the Technical University of Berlin and ourselves in the University of Loughborough. We would be very interested to hear of any comments or reports that you receive from operators in response to your request.

The result of our study will be made widely available to all interested parties although of course individual anonymity will be preserved at all times.

T. F. M. STEWART
Lecturer
University of Technology
Loughborough,
Leicestershire LE11 3TU

Identical structure

I WOULD like to correct an error in Quentin Scott's article on the risks involved in designing microcomputer boards.

It was stated that Intel's range of OEM computers could not be used in the Intellec MDS development system and that the CPU card in the MDS was incompatible with the 99C family.

We pride ourselves that the MDS and the 99C family have an identical bus structure and that the two are totally compatible. On occasions, we have run several 99C computers in a single MDS chassis in a multiprocessor configuration. In this context it is important to realize that the MDS/99C bus will support a number of bus masters and allows asynchronous bus communication at up to 10MHz. The bus arbitration logic is such that even slow masters connected to the bus do not suffer a disadvantage in obtaining control of the bus.

JOHN HYDE
Intel Corporation (UK)
Oxford

BSI procedure on decision tables

YOUR critical article about BS 5487 (CW, August 4), shows distressing lack of knowledge about BSI procedure. May I put the record straight?

In the production of a British Standard, one of the key stages is the issue of a draft for public comment. New drafts are listed monthly in BSI News. This magazine has a wide circulation which includes the press so that select lists of available drafts may be, and often are, included in technical journals.

Decisions regarding the comments and regarding the technical content of the standard are taken by the technical committee whose members are nominated by interested organisations, including government departments, trade and professional organisations, and scientific institutions. In the case of BS 5487, replies were returned by seven organisations which accept the draft as issued, 11 organisations which made specific technical comments and two organisations which returned amended versions of the text. Every comment was considered.

Any comments received by a committee after the closing date for public comment, but before the text is approved for publication, receive consideration by the committee if at all possible.

In the case of BS 5487 a late comment was received after the standard was sent to press. This comment and many others received since publication are welcome and will be considered by the committee both with a view to possible amendment, or revision, of the British Standard and to formulation of the UK attitude towards a corresponding international Standard currently in preparation.

PETER WELLS
Senior Technical Officer
British Standards Institution.

OP SPOT

. . . this week considers the need for a universally acceptable qualification for operators.

Some indication of ability is vital

A UNIVERSALLY acceptable qualification for operators is long overdue.

At present a range of "qualifications" are available, few of which are well known, and none universally acceptable.

At the bottom of the ladder are young people fresh from one of the many commercial training schools who are keen to enter the industry in any way. They arrive at an interview, clutching a certificate, only to be faced with the reality that the certificate from the course for which they have recently paid a large sum to attend, is in fact worthless.

Many of these people, having been led to believe that their certificates were the key to a career in the computer industry, do not possess the educational qualifications and standards to secure a position in the industry. They are totally unemployable.

The City and Guilds Institute does hold an examination in basic computing. This is not really acceptable to the operations staff, but it is infinitely more acceptable than the courses organised by various commercial training bodies, the vast majority of which are in no way acceptable to the industry. And to do a City and Guilds course is far cheaper.

At the other end of the scale are the operations staff who are keen to make a career within the industry, but are unable to obtain any concrete proof of their ability to enter, simply due to the lack of a nationally recognisable qualification.

The BCS operations group has been concerned, since its formation, with the lack of a nationally recognisable qualification; but as yet no concrete plans have been formulated to correct it. Membership of the BCS in other disciplines of the computer industry is acceptable as an indication of proficiency. However, in operations, this does not really apply. It is essential that this be rectified.

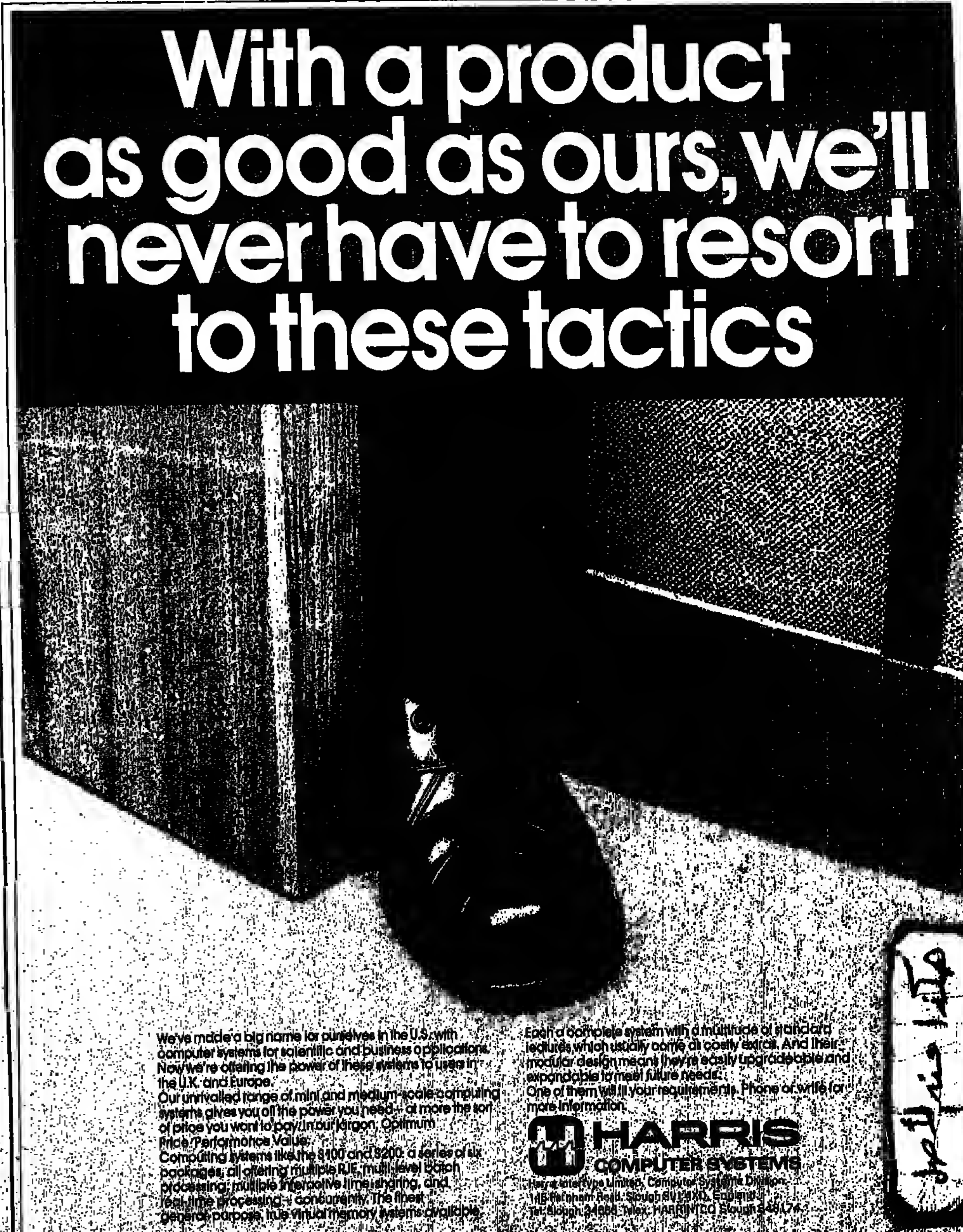
It matters not whether the BCS, the City and Guilds Institute or another body takes up this challenge. But it is essential that a recognisable qualification be introduced for operators which reflects a true indication of the holder's ability and professional attitude to the industry.

It is also essential that talks be held with representatives from interested parties within the industry, to formulate the fields to be covered by the qualification.

Some might scoff at the suggestion of introducing a qualification solely for operations staff, but this is what operations people want. It should be remembered that the majority of operators are engaged on shift-work and, as such, their leisure time is much more valuable to them than it is to others. Yet they are willing to give up this time to study for a qualification which as yet is not available to them.

A recent letter (CW, August 11) stated that the cause of a lack of technical knowledge in operations staff was not due to a lack of formal training, but largely due to apathy.

Not all computer rooms suffer from the lack of training syndrome; although many suffer from apathetic operators. What is needed is a competitive spirit and a goal in the form of a qualification which would assist in helping to dispel the problems of apathetic and uninterested operators.



FILE DESIGN Part 9 By Owen Hanson

Software aids

THE file designer has at least two possible sources of software; these are the computer manufacturer and software houses. In some cases a third source — in-house written software aids — is also available.

In handling sequential files, the designer needs to know if the manufacturer provides a record storage format that will allow skip-sequential processing, and thus improve sequential run times, as described in Part 4. Such a format will need to hold the key separate from the main body of a record, so that it can be examined in time for the data to be read in or rejected depending on the value of the key. The details of IBM's two record formats for sequential files are given in Figure 1.

Effective randomisation of record keys is vital if directly organised files are to perform efficiently. This was dealt with in Part 5. The user can check this himself, but it is a laborious process.

Manufacturers and software houses usually have programs available to analyse the operation of randomising algorithms on a given set of keys, and indicate if they are satisfactory. However, because each direct file differs in some way from all others, the user will generally have to design his own algorithm.

The efficiency of an indexed sequential file will depend on a number of factors. Those that change due to addition of records will include:

- The number of cylinder overflow areas that are full.
- Space remaining in the independent overflow area.
- The number of references to non-first overflow records (first overflow records need not slow up direct references to an IS file).

Reorganisation of the file will be required at intervals, see Part 6; if runs all contain the same number of operations, run times may give sufficient indication of the need to reorganise. Usually this does not apply, and information on overflows etc is a better guide.

IBM's IS files include a label area that is available to the user during a run, and is automatically updated when the file is processed. The designer should ensure that this information is being used.

Provision of additional buffer space in main storage by the user can also be effective, as manufacturers' IS software can use this area to add records to the file more quickly than can be done using the supplied IS module space only.

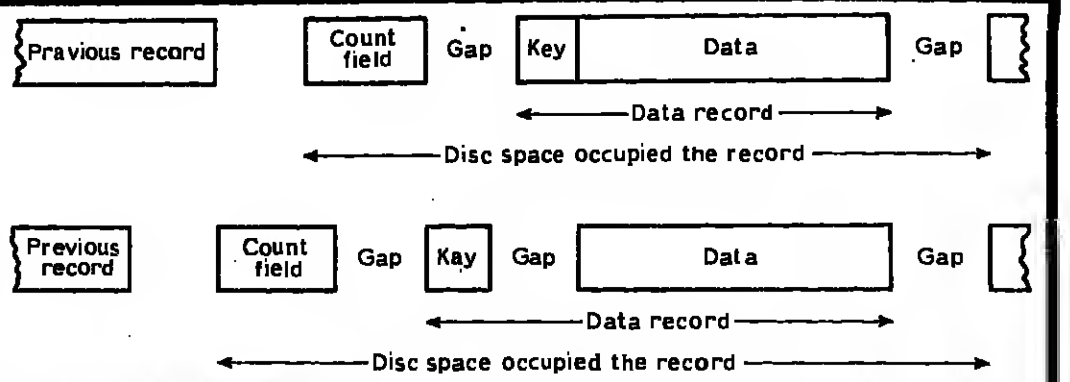


Figure 1. Formats available for records held on IBM sequential files. Top, this format saves disc space, but it is not possible to examine the key separately. Above, this format allows the key to be compared with a given search key, in time for the key and data to be read into main storage if the record is required.

The computer manufacturers make great efforts to provide effective software. However, they cannot cater for all possibilities, and this allows software houses to offer packages that improve on standard programs in various aspects.

An example of this is the arrangement of records in ascending key sequence. This is the most logical way of storing records, but it leads to relatively short times being available for processing without loss of revolutions, and so time, if *every* record in the file has to be referenced.

This situation is shown in Figure 2A, for records stored in three equal blocks per track; more time is available using double buffers, but it is still only sufficient to handle relatively brief processing.

Arranging the blocks in a "staggered" fashion, as shown in Figure 2B, provides a great deal more time for processing without loss of revolutions.

The minimum number of revolutions that is required to process the file will now be greater, because the 1, 3, 2 arrangement allows for two revolutions per track rather than one. However, idle time while waiting for the next record to be available is often markedly reduced by this arrangement, as processing is more often completed within the available time, and extra revolutions are avoided.

An example of this technique is employed by Comten, a London software house, in its AMIGOS package which is offered as an alternative to IBM's ISAM, and considerable improvements in performance have been reported by users.

Space can also be saved, in comparison with manufacturers' software, by blocking of overflow records; modified indices can lead to more rapid retrieval, and improved reorganisation techniques can cut run times.

A further area in which software houses can help the user is that of performance. Software or hardware monitors may be useful in deciding why a run is taking longer than it should; for example, details of the usage of direct access storage can pinpoint problem areas in file handling.

Similar software, designed to supplement or supplant manufacturers' products, is available from many companies and the file designer should be familiar with those that might assist him in his task.

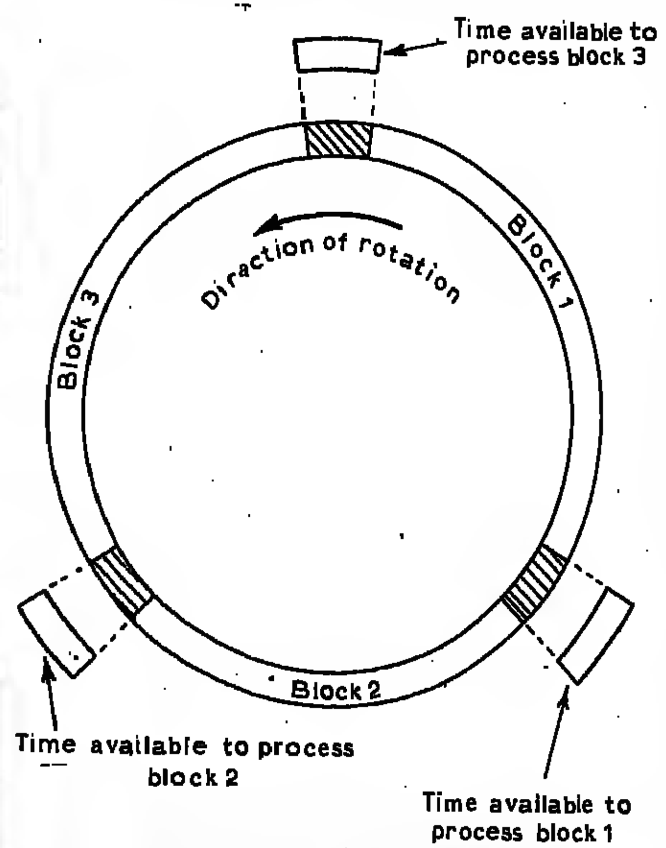
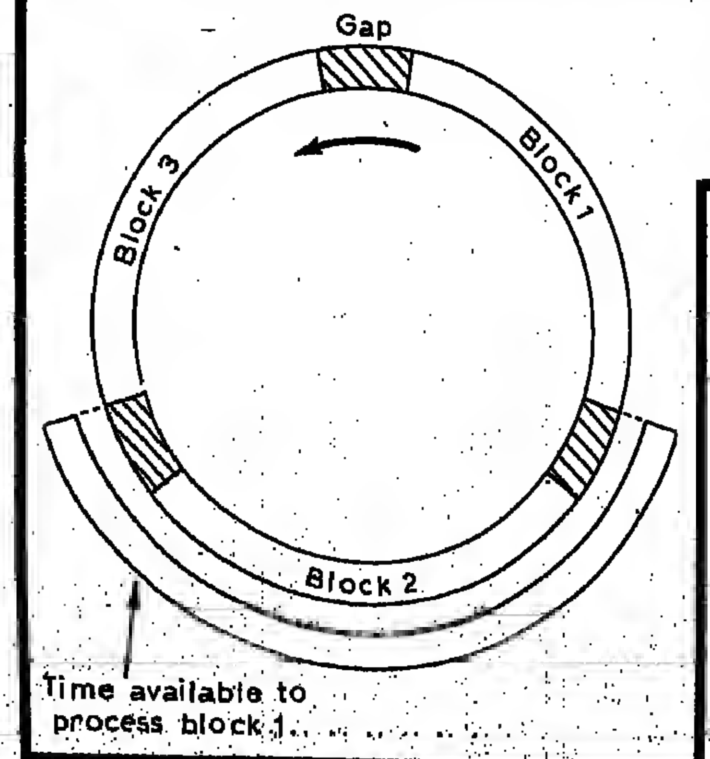


Figure 2A. These diagrams show the time available for processing if records are stored in ascending key sequence. Above, single I/o buffers; below, double buffers.



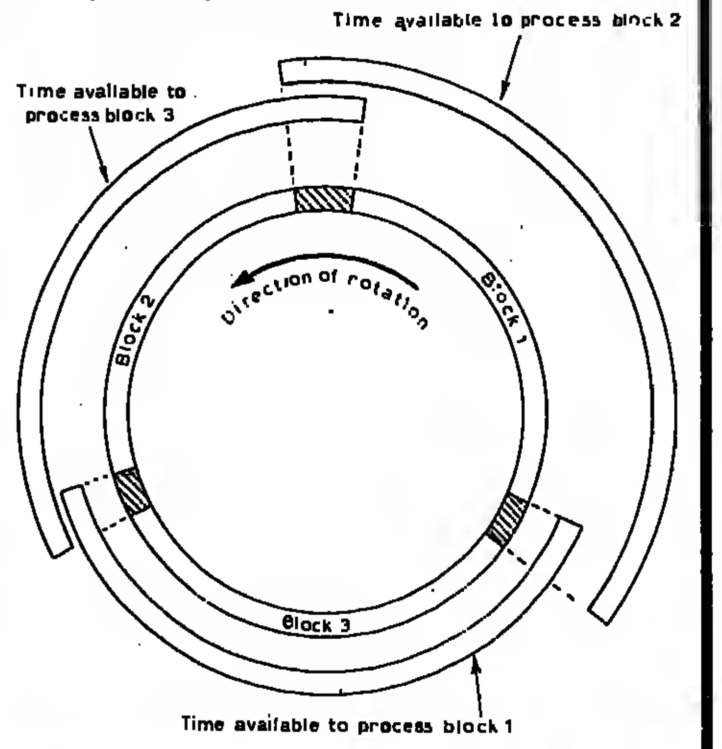
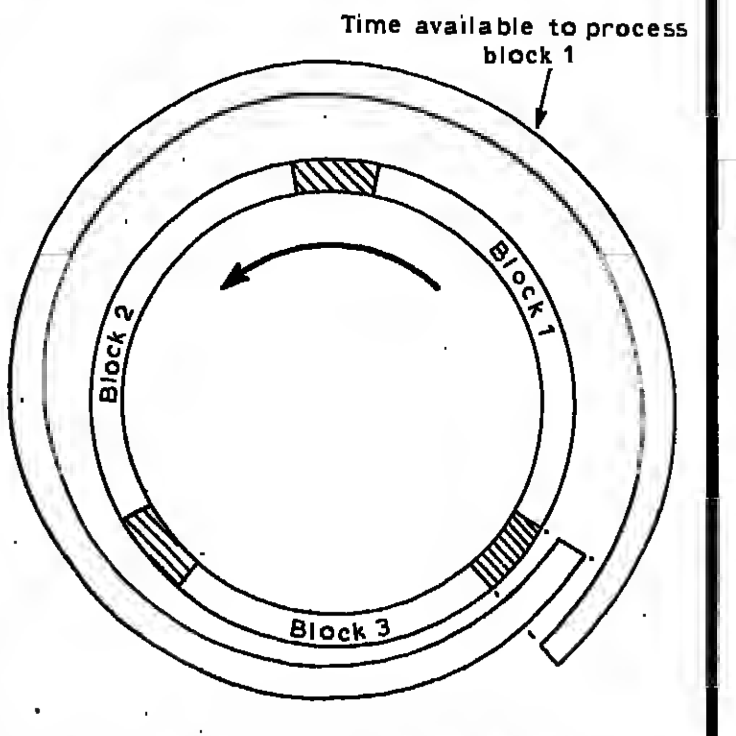


Figure 2B. These diagrams show the increased time that can be made available without losing revolutions if records are stored in staggered sequence.



ICL extends S African centre

THE concept of the joint ICL 2903 customer centre, which involves a company installing a larger 2903 than it needs and sharing the system with ICL, is well-established around the world.

However, ICL South Africa, one of the company's most successful and enterprising outposts, has extended the concept to the 32-bit 2900s, and is sharing a 2970 with Greatermans Stores.

Greaterman's current requirement is for only half the processing power of a 384K-word 2970, but by 1980, will need most of it. Meantime, the machine is being run as the ICL South Africa Joint Customer Centre, providing time for ICL to use in demonstrating the capabilities of the 2970 to potential customers. In addition, people who are waiting for delivery of their own 2900s will be able to use the machine for program conversion.

People wanting to use the machine for this work will use the machine in general as they would a bureau, installing an ICL 7502 or 7503 terminal and linking to the 2970 via one of the 128 lines it is configured to support.

The 2970 is running under the VMW/B operating system, and the machine will be used simultaneously by the store, ICL and its customers throughout the day.

An accounting algorithm has been written to interface with the VMW/B accounting procedure and this will determine the amount of time ICL has used each month.

Greatermans has plenty of conversion work of its own, because it is moving its workload from an ICL 1904A.

For its size, South Africa is ICL's most successful market, and has already given the company orders for 12 32-bit 2900s. These comprise one 2980, two 2976s, six 2970s and three 2960s.

French show off packet switch know-how

FRENCH hardware, software and expertise in packet-switching were strongly featured at the Toronto IFIP exhibition.

The French PTT exhibited the CP50 switch which has been developed for the Transpac packet-switched network, and also implemented several transatlantic network links, some of which involved Canada's Datapac packet-switched network which uses the X25 standard interface.

The French PTT has adopted a microprocessor design for the switches in its Transpac national network, and the minicomputers, SEMS Mitra 125s, are relegated to the roles of call set-up and performance monitoring.

The Transpac switches, which have also been adopted, along with the Mitra 125, for the EEC's planned Euronet network, were developed by TRT, a French subsidiary of Philips.

Called the CP50, the TRT switch is built up of three modules, each based on the Intel 8010, a single board microcomputer driven by an 8080 microprocessor.

The three units are the Group Unit, which handles level 3 of the standard X25 interface, the Synchronous Line Unit, for HDLC users, and the Asynchronous Line Unit, for supporting character terminals.

Several line units can be attached to each group unit, and several group units can be attached to the high-speed ring bus through which the Mitra [illegible] mini monitors the packet exchange.

The CP30 switch is one of the options open to the Post Office for the public packet-switched network currently under consideration to succeed EPSS (CW, July 21).

One demonstration at IFIP involved a link between Datapac and the French PTT's experimental RCP network, and direct terminal links were made to Cyclades, the first French experimental packet network which links a number of research establishments.

Various European databases were accessed via Cyclades links with the UK National Physical Laboratory's network and the European Informatics Network, EIN.

Derek Barber of EIN sent a message via Datapac, RCP, EIN and the NPL network to his office at Teddington.

Kent sets up European Division

A MAJOR re-organisation of its overseas marketing and sales services is being planned by the George Kent Group, and is due to come into operation next January.

A new European division will be set up, comprising the Kent sales companies in Austria, Belgium, France, Germany, Holland and Spain. The division will be run by Michael Dennis.

The group's existing International Division, under Walter May, will be responsible for business development outside Europe.

Harris' new office

TO extend the sales and service support offered to customers in the Midlands and the North West, Harris Computer Systems has opened an office in Manchester. The [illegible] 143 The Piazza, [illegible] Manchester, M1 4AW. Tel: [illegible] 3565.

COGARVIEW

Another revolution in the office

George Cogar says that the evidence in favour of the basic, stand-alone memorising typewriter is becoming overwhelming. And he believes it could catalyse a second office revolution as significant as that set off by the first clattering manual machines in 1888. . .

RETIRED generals will probably still, in 1990 or perhaps even in 2000, be hammering out their memoirs on traditional typewriters: technological change takes a while to filter out to Gettysburg or Chipping Sodbury.

But to the serious end of the typewriter market — the office end — even today's electrics will seem as obsolete as the quill pen in 1977.

In making this prediction I am not implying anything startling in the way of hardware innovation. The standard office typewriter of a decade hence is with us now. It is, give or take a few modifications and a few rival manufacturers' models, the IBM Memory Card 11.

The office equipment market knows a good thing when it sees one; it has also, over the years, shown a remarkable resistance to the false dawns of new generations.

It allowed itself to be revolutionised by the manual typewriter—in the process achieving a far more significant blow for women's lib than any burnt bra — and then stuck with it for 90 years, eschewing almost every attempt at an upgrade.

The "qwerty" keyboard layout was originally devised to slow down typing speeds artificially, because efficient typists could wreck the ponderous mechanics of early models.

But once established it became enshrined, despite all the comprehensive research to prove that alternative layouts were more productive. Even the acceptance of the electric typewriter was only a grudging post-war phenomenon — some 15 to 20 years after the first one had been marketed.

But the evidence in favour of the basic, stand-alone memorising typewriter is becoming overwhelming, and I believe it could catalyse a second office revolution every bit as significant as that set off by the first clattering manual machines in 1886.

At the same time I do not believe that any significant number of office equipment users will be tantalised by the sophisticated systems-oriented end of the market.

I'd be surprised if micro-based word processing systems with random access storage and multiple communications facilities will have captured even 15% of the total typewriter base ten years hence.

It is an interesting characteristic of the word processing market that it has been dominated right from the start by the users' interests — so different from our own beloved computer industry.

The most dramatic illustration of this is the IBM MT/ST, which really started the ball rolling in 1964, though, of course, the Friden Flexowriter was the first genuine word processor.

IBM itself never glimpsed the potential of the MT/ST. It thought of the machine solely as a device for taking the tedium out of the multiple repetition of documents in environments where a copier was not suitable — solicitors' offices, for instance. And in one of the classic market underestimations of all time it even came up with an estimate of total sales — 6,000 machines!

But office managers could see what the MT/ST could do, and the demand took IBM completely by surprise. Today it is a fair guess that two-thirds of all word processing units are this machine or its hastily conceived successor, the MC62.

And with its Selectric customer base — amounting to over two million units — IBM is quite capable of dictating magnetic card memory as the standard for the stand-alone end of the market in spite of its limitations.

In fact word processing has been a total blind spot for IBM, which had a bite at the cherry even before the accidental popularity of the MT/ST.

The US corporation actually developed an electric typewriter which used paper tape as a recording medium during the second world war. It was not designed for text editing, but it had all the elements of what we are now hailing as a revolution in office machinery. Thirty years is quite a lead time even by the standards of the conservative office machine industry.

But IBM never saw the significance of this first word processor. It was spun off to an IBM affiliate, Commercial Controls Inc, which produced a few desultory units before being sold off to and swallowed up by Friden in the middle-fifties. And it was that machine that became metamorphosed into the Flexowriter.

The manual typewriter was an enormous emancipator — it brought women into offices for the first time in significant numbers, even if it did dictate a role which has become more constricted as the twentieth century developed. I believe the word processing revolution could do a similar job.

It is already the experience of many office managers that the way in which an office works, and often even the organisational structure of a company, is understood best by its secretaries.

Indeed, they may sometimes have a better understanding of such matters than the executive whose responsibility it is supposed to be.

The growing automation of office work can only accelerate this trend. As the machines become more and more complex and flexible, the comprehension of their operators will become more and more critical to firms.

In due course, this should mean greater opportunities for women, a gradual blurring of the distinction between executive and secretarial jobs, a greater inter-dependence between boss and secretary rather than a fragmentation of that relationship.

Stationery firm offers chances to school-leavers

A COMPUTER stationery distributor is aiming to turn school-leavers into salespeople. SCS Business Systems of Croydon, will spend six months teaching them office procedures like typing, basic accounting, and operating a Telex machine and a telephone switchboard, and then send them on customer calls, often unaccompanied.

The first two school-leavers, a 17-year-old boy and a 16-year-old girl, start next month. SCS aims to take on another two in six months' time and a further two in 1978.

The company says it looked for qualities like personality and the ability to write, rather than academic qualifications, when choosing the first two. It insisted, however, on five O-levels.

Chances for school-leavers in stationery sales are apparently good. SCS says it took on a school-leaver four years ago and he is now the top salesman.

Contracts 'strike' in Australia

BECAUSE of changes in the Federal Trade Practices Act, major computer manufacturers in Australia, led by IBM, are declining to sign contracts with new customers. The move follows enactment on July 1 of amendments to the Trade Practices Act, which effectively leave computer manufacturers with open-ended liability on equipment or services supplied under contracts worth less than $15,000.

ICL continued to trade normally and IBM continued to accept orders and letters of intent.

Datafair 77 conference

ONE of the speakers at the forthcoming Datafair 77 conference to be held at the Cunard International Hotel, London, from October 4 to 6, will be Dr Chris Evans, head of the man/machine interface department at the National Physical Laboratory, Teddington.

He will discuss recent developments in computer technology outside traditional areas, including medical and educational applications.

"We have to find a way to make computers more acceptable to people," commented Dr Evans.

IFIP ROUNDUP

Reports from Canada

by Malcolm Peltu

and Stephen Bell

The things they said in Toronto

"MINIATURISATION is being taken to such extremes that soon someone will have to invent the micro-electron" — Professor Edsger Dijkstra.

HUMAN CONNECTIONS

Electronic mail has a potential for transmitting pornography. But that was not what Dr Ron Uhlig had in mind when he said that a US Army computer-based message system could improve "human connectivity, i.e. the ability of humans to connect to other humans." He was, of course, only talking about human message connectivity.

IMPACT ON WORK

At one pre-lunch conference session, the theme was the impact of computers on work. And higher unemployment was represented as a generally "bad thing." After lunch, the theme was how computers could enable us to do wonderful things in the increased leisure time created by more unemployment. Thus do the experts ponder our future with decisive uncertainty.

MEANINGFUL JARGON

ROM in Toronto has a different meaning from normal computer jargon. It is Royal Ontario Museum. But what is a museum if not an historical read o memory?

ENGLISH FOR BUSINESS

"Language problems in Canada w disappear if it was agreed to use English business and French for pleasure" — Professor Wlad Turski, Polish chairman the IFIP 77 programme committee.

Slow response by manufacturers to fast-rising demand from 'naive' users


Chris Evans . . . biggest influx yet of naive users.

THE general problem of communication between a computer-based information system and the "naive" user, was *extensively* treated at IFIP by an international panel session.

The session explored the implementation of "human" interfaces for various categories of non-expert user, including businessman, students and specialists in non-DP fields. At the same time, some generally applicable guidelines to such systems emerged.

Principal among these guidelines were the necessity of a simple and consistent syntax, preferably a subset of natural language, and the availability of an ultimate human contact to supply what the user saw as the gaps in the system.

Jim Bair, of the Stamford Research Institute, isolated one important category of "naive" user: the office and clerical worker.

Up to 90% of clerical tasks could be aided by computer, he contended. At a later stage, the session chairman, psychologist and computer scientist Chris Evans, pointed out that possible developments of television-based terminals would give perhaps the biggest influx yet of naive users.

Paralleling such trends was the general advance in hardware and software technology, making "human" interfaces more feasible, and the increasing sophistication and inventiveness of modern management, resulting in an increased demand for such systems.

The UK member of the panel, Mike Tyler, has taken part in the development of the Post Office's Viewdata television terminal system, and concentrated on the cost-effectiveness aspect of the naive user interface. Use of such existing communications media as television and the telephone could bring an unintelligent LSI-based terminal to the public for as little as £50 to £75.

Evans summed up the most important factor in the situation: the fast growth in demand and the slow response of manufacturers. "We thought it would be five to ten years from now before we had to *face* these problems. Now it seems more like two years".

The audience took up the theme of slow progress by pointing out that the panel had laid down few guidelines for the future.

The panel had to admit that "guidelines on the subject are only now beginning to emerge," and as panellist Don Bitzer of Control Data pointed out, "If we compare our guesses of five years ago with techniques that seem to work nowadays, we see how wrong we were".

It would be another five to ten years before the appropriate solutions became clear.

Consult the workers

THOSE who were to be affected by the impact of new technologies were too rarely asked to explain their views at learned conferences, said Jean Claude Perrot, head of the Canadian postal workers union, at a session on the effect of computerisation on employment levels.

He said that when it was academically argued that computers can maintain or even increase employment levels by creating more jobs than are destroyed, the workers to be affected should be consulted.

It was no consolation for a worker whose job was to be eliminated to be told that another job, in another industry in another geographical area, might be created.

Consultant Iann Barron said he believed that we had already begun to see the first signs of a general raising in unemployment levels due to increased automation and that, while in the long term the new information technologies might have a benign influence on society as a whole, society would be faced with some harsh decisions over the next 50 years or so on how to handle short-term difficulties in order to prepare the basis for long-term prosperity.

Database systems 'must be grounded in human language'

MUCH of the discussion of database systems naturally treated the more detailed technical aspects of data organisation, but the speakers never lost sight of the ultimate aim of convenience for the non-DP user.

G. M. Nijssen of Control Data, for example, took as the first premise of his paper "on the gross architecture for the next generation of database management systems" that DBMSs had become too computer oriented.

"A reasonable approach (to database management) not hiding behind professional jargon must be comprehensible to the average layman and grounded in the facts of human language."

Building on this principle, he described an experimental "conceptual scheme" for databases whereby, taking a formal linguistic approach, the relationships between data entities could be expressed as straightforward sentence structures or alternatively, as diagrams.

The idea of such a conceptual schema, in addition to the physical storage and program interface schemas characteristic of a Codasyl database, has been gaining ground. Nijssen admitted that the various component ideas of his DBMS were not new, "but the combination of these ideas is new."

Tools have been added to perform transformations between conceptual schema commands and instructions phrased in terms of the physical storage or program language schemas. Nijssen maintains that these three distinct schemas are confused in many existing DBMSs. His database system has been released by CDC as a specialist product to a limited number of users.

Treatment of a similar problem was evident in a paper by Hermann Helbig of the Robotron Centre, Dresden, on "deductive answer finding in question-answering systems" with the difference that the conceptual angle was the only one to be dealt with. A syntactic semantic analysis scheme enables the user to enter statements into the system, and subsequently ask questions, the interface being solely in the form of standard sentences.

A number of other aspects of database and information management were considered at the conference, with their contingent problems of database theory, security, privacy and integrity of information systems.

Kurt Ziegler, of IBM, discussed a concept often regarded as verging on the mythical: the distributed database. Reflecting this scepticism in his title "Distributed database, where are you?" he cast his talk in the mould of a tutorial to executives on the various levels of distribution in computer systems. These levels — identifiable broadly as distribution of function, systems, processing and data were often confused. For a measure, there was also a deal of confusion b distribution and decen tion (data can still be distr from a central source was pointed out between data and info

DISTRIBUTED PROCESSING

Two approaches to systems design

Distributed processing is one of the computer industry's most fashionable buzz-words, but few people know what it really means and even fewer have much experience of this new computing method.

Two users who have looked into distributed processing describe their experiences in this supplement. Peter Murphy talks about the thinking behind a move from centralised to distributed processing at his company, Elida Gibbs; while Mike Berry tells how Cadbury Schweppes discovered that despite the manufacturers' claims, the ideal hardware and software for distributed processing are not yet available.

And Ken Wong, a security specialist at the National Computing Centre, gives advice on solving the security problems posed by decentralising processing power.

But first, on this page, Sean O'Connell defines distributed processing — and also says what it is not, then describes the two main approaches to it.

By Sean O'Connell

THERE can be no doubt that the trendiest piece of jargon in the computer business since "database management" hit the headlines a few years ago, is that of "distributed processing". And like database technology, it has started off as an *empty* phrase, meaning exactly what the individual using it wants it to mean.

What features go to indicate what is a distributed processing system? There are several.

But at this stage in the development of the technology, it should be made clear that the intention of taking the computer's power to the end-user, to bend applications and data formats to accommodate non-DP personnel, and be simple to understand, operate and program; these are the signposts which indicate a true distributed processing system.

Other easily-noticed characteristics are the lowish costs per user terminal (under about £500 per month, including hardware and software rental, maintenance, line costs including modems, data storage and central site processing charges); a system concept which enables the end-user to create, amend and process his data either locally or remotely without him having to haul in hordes of computer professionals; some sort of access to a database through comms lines; and considerably more processing power than is represented by the black box beside the VDU.

This is all very fine in theory; how is it achieved in practice? Given that Herb Grosch's law still remains good (Computing power increases as the square of its price) for modern technology processors, then it seems logical that centralised CPU power can be used more effectively by allowing mini systems located remotely to converse with it.

Remote batch terminal systems such as IBM's 2780, ICL's 7020 and CDC's 200 UT were early stabs in this direction, allowing the computer-oriented customer to submit his jobs directly into the central site from a local card reader and receive back the processed (or ABENDed) result on a local printer.

The equipment was not very clever — quite a lot of RBTs are really no more than stripped down and refurbished second-generation processors and memories, very good for the ecology movement and the suppliers' idle equipment inventory, but a bit rough on those unsuspecting customers who think that they are going to get a shiny reliable new machine.

But time went by and new, improved terminal systems were invented by the manufacturers to bring down the price and improve the speed of job turn-around to the market-place.

All sorts of goodies were introduced, such as data compression, alternate and multiple input and output peripherals, 'multi-leaving', and so on.

As the number of terminal protocol types proliferated, so did the number of users and suppliers. Nowadays all the world and his wife seem to be offering superior, cheaper RBTs.

Because demand was increasing out of all proportion to the scheduled phase-out rate of potentially recyclable old CPUs, suppliers had to start using the emerging range of minicomputers.

As economies of large-scale production were effected, so hardware prices tumbled and performance increased. The per penny cost of processing, albeit on rather basic machines, had never been lower.

Consequently people began to think about all that processing capability locked up and going to waste in performing stupid terminal conversation handling. Would it not be a good idea to use the local processor more fully? — perhaps by marrying up data entry and data conversion with RJE?

Meanwhile, minicomputer systems had been making big inroads in the user market-place generally. Processor-controlled keying and other data entry systems consumed a lot of mini production, and all sorts of users who could not afford or did not need the more expensive facilities of the mainframe computers had quietly been installing these revolutionary machines, literally by the thousand.

In 1975 there were £3,000 millions-worth sold; the rate of increase in sales has been and is expected to continue to be about 25% per annum. This will rise to about the £9,000 millions mark, come 1980.

This compares with the more pedestrian rate of growth during the same time-scale of about 11% for mainframes, from £28,000 millions to an anticipated £50,000 millions.

The ambition behind a distributed processing system is (or should be) to return to end-users of computing facilities the control and responsibility for their own data at an economic price.

There are several advantages in this philosophy: it places the onus for getting the data right back where it belongs – among its originators and users.

It enables corporate management to observe and assess just how much or how little use is made of computerised information.

This makes it much easier to lop off a useless tentacle from the computer department; it is notoriously difficult to disentangle a muddle of monolithic centralised batch processing tasks.

A more difficult-to-assess advantage inherent in distributed systems lies in the fact that data held in diverse locations can be far more pragmatic and wide-ranging than would be tolerable on a conventional central batch system. This enables the end-users to re-humanise the computer system if they so wish.

There are broadly two approaches to distributed systems design: hierarchical and horizontal.

With a hierarchical approach there are broadly four definable levels in the hierarchy — a central data utility, usually one or more big machines able to administrate the data and task demands of both distributed processes and the local batch, RJE and time sharing users. Consequently the possible suppliers are limited to those companies which have experience in this area.

The second level in the hierarchy is that of the satellite or concentrator computers, operating into the data utility device. This will be based on a powerful and possibly quite expensive mini, for it must be able to administer a communications network protocol of some kind, act as an RJE device to the data utility, handle online interactive terminals, and do local batch work as well.

The third level comprises the intelligent terminals. These may be application-engineered for certain purposes, for example point-of-sale, passenger seat reservations, electronic funds transfer and so on. These terminals will be bright enough to handle a number of peripherals, and possibly a number of keyboard/VDUs, as well as talking to the second level satellite machine.

The final level comprises the user terminals themselves, inherently fairly dumb devices. They normally operate asynchronously and comprise a VDU, keyboard and an interface. Possibly, they may be able to incorporate OCR wands or OMR light pens, badge readers, hard-copy printers, paper tape and punched card readers and other devices able to subscribe to the RS 232 specification.

Horizontally-organised distributed systems have all the components of hierarchical systems except one – that of the central data utility.

This implies that the satellites become autonomous but co-operative mini-central facilities. They must be able to decide among themselves when to call upon each other for extra processing power or items of data, to handle incremental data transfers for system defence, and be able to assume master or slave status as the situation demands.

Obviously the software overheads are going to be very considerable, as these tasks are very much more complex than those outlined for the hierarchical system's satellite.

This may help to explain why many more hierarchical systems have been successfully implemented than horizontal ones.

One thing is certain: the control software in horizontal systems must be built and maintained by top-flight systems and programming staff. By their efforts alone the whole scheme stands or falls, unlike the hierarchical system which can tolerate a retreat back to tried-and-tested RJE and time sharing if necessary.

There is nothing particularly remarkable about the system components just described. So what is all *the fuss* about? The big innovations lie with surrounding software, and as has been hinted at, this is the weak (or strong, depending on your degree of pessimism in computers) link in the whole concept.

If you are going to distribute or decentralise the processing capability, the logical next step is to do the same with the data facility also.

There are some useful criteria *for deciding whether to distribute* the database and, to a large extent, these criteria also assist in judging whether to distribute the processing too.

These criteria are: is there a need for high volume and/or rapid response by applications software at numerous remote locations which also need some number-crunching capability?

Do these same remote sites also generate large quantities of data required for immediate interrogation mainly by local users?

Alternatively, does the central computer generate lots of data which is primarily used locally rather than centrally? If the answers to these questions is positive, there may well be a case for distributing the database.

Having decided to distribute the database the fun really starts. The software to administer the distributed database is considerably more complex than conventional DBMS. Apart from the storage and retrieval element, there are two other major software components to be implemented.

The communications software to supervise the transmission and receival of messages between processors is an obvious necessity, but the network component is often either minimised in importance or simply overlooked.

The network component has three main functions – keeping track of where data elements are throughout the whole system and the combining of a transaction with its operational data; the management of simultaneous access to data and recovery from system failures; and to control sequential access to data and organise its transmission to and from the user.

To this end it will be necessary to decide on the nature and physical location of the master directory or 'superschema'. With some popular hierarchical systems you do not have any choice, they must be centralised and indexed sequential because that's the way it is.

But in a perfect world the systems designer should be free to decide for himself whether to locate the superschema to suit the nature of the organisation.

Obviously, the bigger the database the bigger the superschema, and the designer is faced with decisions to make about machine capacity and performance. To keep complete superschemas on each distributed processor increases performance, but is very expensive and time-consuming on inter-processor communication.

The alternative to the distributed superschema is to have centralised superschema, interrogateable and maintainable by all remote sites. This is perilous, as it requires much more complex software, very broad band and rapid communications facilities, and superb systems design. At present there do not appear to be any working examples of this approach which the owners have too much

● Turn to page 18

Getting the network mixture right first time

By Peter Murray

A mixture of central batch processing on a mainframe, distributed processing based on minicomputers, and specialised work using a bureau is the aim of Elida Gibbs, the health and beauty aids subsidiary of Unilever. The firm's management services manager, Peter Murray, talks about the thinking behind the change from purely centralised processing.

SUCCESS as well as failure can create problems for a company. Rapid growth can mean that resources which were once more than adequate become stretched and less effective. The art of good business, therefore, is to be prepared for growth and to plan development of resources to suit. More often than not these days, expansion entails further investment in computer systems.

Elida Gibbs, the UK health and beauty aids subsidiary of Unilever, is now carrying out just such a plan which, when implemented, will make use of communicating minicomputers for real time work, a mainframe for batch jobs, and the services of a bureau for specialised operational research work.

This, it is thought, will produce the right blend of computing power to serve the growing needs of the firm. The company has been using a computer since 1965, and now has an IBM 370/138 with 3330 discs, telex plug-compatible tapes and Sanders 3270-compatible display units, all in London.

There is also an IBM 3780 terminal at the Seacroft factory in Leeds, acting as a remote job entry terminal for factory applications sending data down the line to the mainframe. Another factory in the Leeds area (Whitehall Road), collects data on forms which are transported by bus to the Seacroft factory, where they are keypunched ready for input to the 3780.

In 1976, it was decided to build a new warehouse south of Leeds, about equidistant between the Seacroft and Whitehall Road factories. At the same time it was realised that the 370/135 then installed would run out of capacity by the end of 1977.

The company was therefore faced with either a major upgrade of its mainframe, or the decision to re-organise its DP activities. With four sites (two factories, the London office and the new warehouse) needing DP facilities, the opportunity was grasped to distribute processing out to where it was needed.

In order to meet the company's objectives, a plan was developed to cover three basic applications. All three will make extensive use of Cincom's Environ/1 teleprocessing monitor in our customer service applications, and will benefit from the use of interdepartmental databases, updated in some cases on different sites. The diagram in Figure 1 shows how the final system will look.

We have established that with the new warehouse we would have four centres requiring processing facilities (two factories, head office and the warehouse itself).

The first of the three new applications systems to be developed was the warehouse system, which would handle the movement of goods into and out of the warehouse. We decided we would need two minicomputers on site, which would in turn require a local database to keep track of pallets and customer orders going through the warehouse.

Secondly, the new warehouse gave us the opportunity to alter and improve our invoicing and stock control systems. We are planning to have an online database with details of orders, customers, prices, stocks and sales ledgers.

By giving facilities for online inquiry and update, we aim to improve customer service, while cutting our administrative costs.

A customer's details will be accessed on the VDU by keying in the first four letters of his name and town. All details regarding any of his outstanding orders will then be displayed on the screen.

The third application covers logistics planning and factory data capture. This is a large-scale project involving the replacement of existing batch systems in sales estimating, stock planning, production planning and materials control, and wastage reporting. In their place will go a single online system using one database updated in real time via VDUs.

Like most consumer product companies, we have several links in the chain between our markets and the production line. For example, a rise in demand triggers off a revised sales estimate in the marketing department. This is passed to the stock planners who see a need to increase production.

Production planners are informed, and they check that labour and production lines are available. The information is then passed to the materials planners who, if necessary, will instruct the buyer to contact suppliers.

Although our present system operates quite effectively, the fact that each department has its own batch system with its own separate files does create delays and causes extra clerical work.

By creating a single database which can be displayed and updated from VDUs in the different departments, a change of sales estimate, production plan or material availability would be input into the system and immediately its consequences in terms of finished product stocks, material stocks and [illegible] could be displayed to enable planners to take the appropriate action at the earliest possible moment.

Under our new system VDUs will be installed in both our factories at strategic points, and information about materials arrivals, materials usage and production will be input to the database as soon as it happens. As well as being quicker, the system cuts out much clerical work, data preparation, and batch terminal equipment.

A major feature of this system is a mixed integer programming model which produces optimised production plans. Because of the specialised nature of the mathematical programming, this runs on the Scicon Computer Services Univac system at Milton Keynes. This has access to the logistics database which is kept on the warehouse computer system.

The implication of these three applications was that we would have to increase our computer power considerably. Also, half of the existing work on the IBM mainframe would be replaced by the new applications, thereby relieving the load on the mainframe and rendering an expensive upgrade unnecessary.

Having decided that processing power and files should be kept near where they were needed (ie, we took the "distributed" approach) we settled on using Digital Equipment PDP-11/70s as the main machines in our network. The 11/70 is the largest in the PDP-11 range. The system has an integral cache memory and operates under IAS, a multifunction operating system which can handle batch, real time and time sharing simultaneously.

Two 11/70s will be installed at each of our computer centres (head office, and the new warehouse), one to act as the real time machine and the other for batch program development, and back-up when needed. At each factory, a PDP-11/70 is used as a terminal concentrator for local processing. Back-up in each case is provided by a PDP-11/34 which, though smaller, is capable of handling critical jobs in times of breakdown.

At head office, the 370/135 has been upgraded to a 138, in order to give capacity for running certain warehouse and logistics work in batch mode. The 138 will be linked to a local 11/70, and therefore to the rest of the network, via the DEC DX11B, which allows the local real time PDP-11/70 to act like a slave peripheral to the 370.

The warehouse database is located at the warehouse data centre where it is needed, and the order processing database is at head office with the Customer Service Department. The third database, for logistics, though used primarily by the factories and to a lesser extent by the head office and Scicon's system, is located at the warehouse centre. This is because it wasn't worth the extra investment in peripherals and effort to have the database actually on the factories' own PDP-11/70s. The warehouse is, however, only [illegible] miles from each of the factories and seemed the ideal location in the circumstances.

When running, the system will use a mix of proprietary and home-grown software. The database management system we chose was PDP-11 Total from Cincom.

It was also ideal for us in that IBM Total and PDP-11 Total are virtually identical, and this was vital in building an integrated system. A further plus for us was that Total is extremely efficient in its use of CPU time and memory — a fact that makes it an ideal DBMS to run on minicomputers. It can, for example, run happily on a PDP-11/34.

Communications between minis in the network, both local and remote, will be handled by the DEC software system DECnet. This allows a collection of minis to form a network, sharing devices, files and programs, and creating inter-program communication. Elida Gibbs has also written screen control software for the visual display units, so that they can operate in page mode and not the normal character mode.

VDUs can access programs resident in their local machine or can go through Screen Control and DECnet to a remote machine's program. Some applications even run partly on a local and partly on a remote system. This might happen, for example, where a program is accessing a remote database. We felt that it made more sense to have the local program carry out all calculations locally, but interface with a remote program that reads and updates the database, thereby cutting down on transmission time.

The IBM system fits in to the overall configuration via the DX11B and its local PDP-11/70. It receives information either from a terminal, a minicomputer or RJE input files.

All input is transformed by the DX11B to look as if it comes from a magnetic tape or a 2701 control unit. The interface program receives this information, converts it from ASCII to EBCDIC and passes it to the Environ/1 teleprocessing monitor for online applications, directly updates a file or database in batch, or enters the information in the Power/VS job queue for subsequent batch processing.

The network has also saved us a lot of money. We estimate it will cost between 60% and 70% of what a conventional centralised solution would cost to handle the same work. In addition, we feel it is more reliable, with the resources shared across the network, and expansion is easier and can take place more gradually, adding more core, peripherals or processors where and when they are needed.

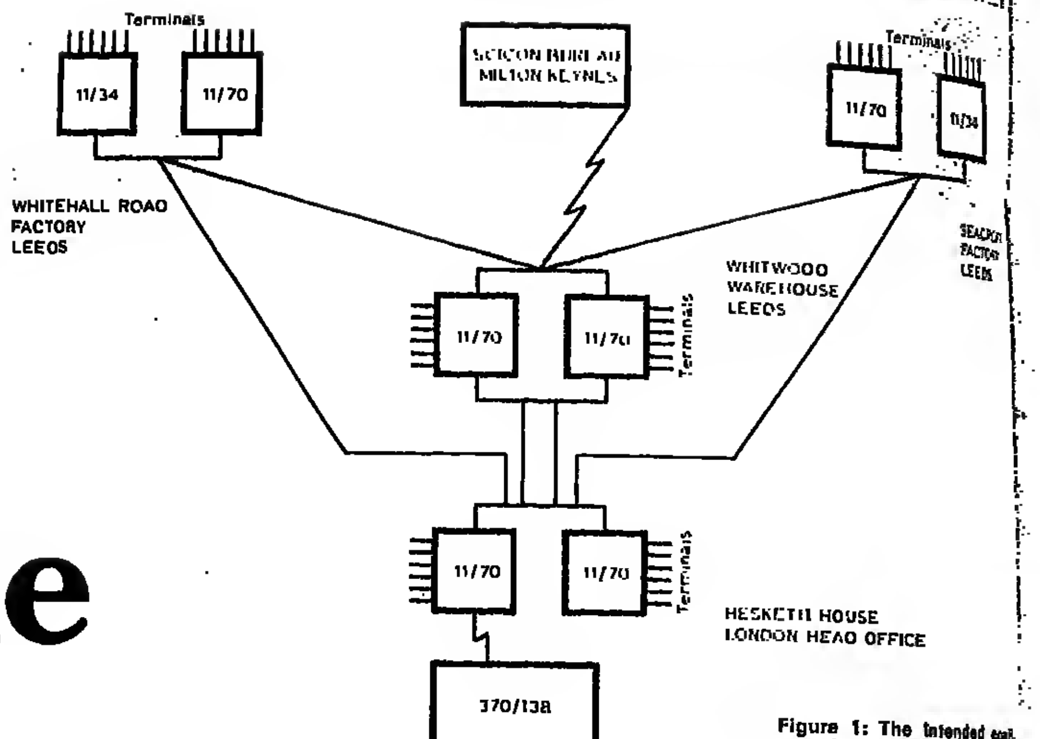


Figure 1: The intended configuration, showing the communication set-up.

Security pointers for the end user

By Ken Wong

Distributed processing puts computer power exactly where it is needed — in the end user's office. But that means that the end user also gets the security problems. Dr Ken Wong, a senior consultant in the National Computing Centre's computer security and privacy division, gives the user advice on security.

DISTRIBUTED processing has brought the services of a large computer installation to the end user's door step, via intelligent terminals or minis linked together in a network or connected to a large host computer. Unfortunately, it has also landed him with problems associated with the security and control aspects of his DP applications and system requirements.

Unlike a large installation, the end user has a very limited budget for providing protective measures and control operations. His staff are not computer specialists. Inexperience in handling DP operations tends to aggravate the difficulties arising from errors and omissions which plague most computer installations.

Because the computing equipment is located on the user's premises, staff tend to regard it as another piece of office equipment. It is difficult, if not impossible, to allow authorised users exclusive access to the operation area. Risks of sabotage, fraud, misappropriation of resources, together with hazards of fire and flood, are more probable than those already experienced by large installations.

The prime interest of the end user is in improvements to the performance or productivity of his business operation, rather than the in-depth exploitation of the technical excellence of the computer resources now at his fingertips.

The number of staff who are equipped to design systems, write programs and run jobs is probably very limited. Segregation of duties may prove impossible or difficult to enforce. Potential perpetrators are provided with more opportunities for attempting fraudulent practice. Authorised users can make full use of their privileged access to explore for private gain.

Although the risks are probably higher, the extent of direct and business losses is probably much lower than that experienced by computer installations. Demands for air conditioning, humidity and dust control are also less stringent.

In the event of a disaster, the replacement cost of damaged equipment is several orders of magnitude lower than for large computers. Unlike a computer installation which provides a service to a conglomerate of user departments, the owner of distributed processing facilities probably only makes demands for dedicated usage. The volume of storage media, stationery and documentation is comparatively small. Back-up and recovery procedures are easier to plan and simpler to enforce.

Failures due to the host computer or communications equipment in the network will not deprive the user of his ability to accept input transactions. The processing of such transactions may be delayed for some time, but they can still be validated locally and put in a queue ready for transmission pending the recovery of the host computer or the communications network.

The end user is well aware of the critical response time required of his distributed system, and what delays or corruptions of service would mean to his business operations. Sometimes the effect of extended disruption of computer resources on his business may even be expressed in financial terms.

Because his staff are business-oriented, instead of computer-oriented, manual fall-back procedures could be developed and handled with ease, in the event of local computer disruptions.

Data control is now completely in the hands of the end user. He can tailor his control and validation procedures to suit his business requirements. If necessary, elaborate checking can be performed locally without causing degradation of performance to the host computer.

Input errors may be rectified on the spot by user staff who can apply their business knowledge to deal with discrepancies arising from both source documents as well as the transcribed input records. However, the opportunity for compromise also increases, if supervision of error control and data modification is not enforced.

The following are some of the controls to help the end user improve the security of distributed processing. It is not recommended that a user should adopt most or all of them. He must assess his own business requirements on the computing resources in order to decide which of the controls are necessary and adequate for his needs. A cost-effective solution for one user may well turn out to be cumbersome and inadequate for another.

The computing equipment should be installed in a room which should be locked when left unattended. Staff wanting to use DP facilities should enter on a logbook the date and times of log in and log out, as well as the purpose of the visit.

To combat fire hazards, some form of portable dry powder fire extinguishers should be installed in the room, mounted on walls for easy access.

The DP room should have proper drainage against flooding. Plastic covers should be provided to cover all equipment to avoid water damage arising from storms, burst pipes or fire-fighting on higher floors.

The reliability of communications equipment in line and terminal use is not as important as in a time sharing network. If sensitive data is to be transmitted to the host computer for remote processing, an effective safeguard against wire-tapping or disclosure of information due to misrouting to another user would be the encryption of data before transmission.

Latest developments in the US in this area involve the use of microprocessor chips at both the transmitting and receiving ends to carry out the encryption and decryption of data. As a result the host computer suffers no performance degradation. If there is great demand from end users, the volume of production of such chips might bring the price down to a fraction of the terminal cost.

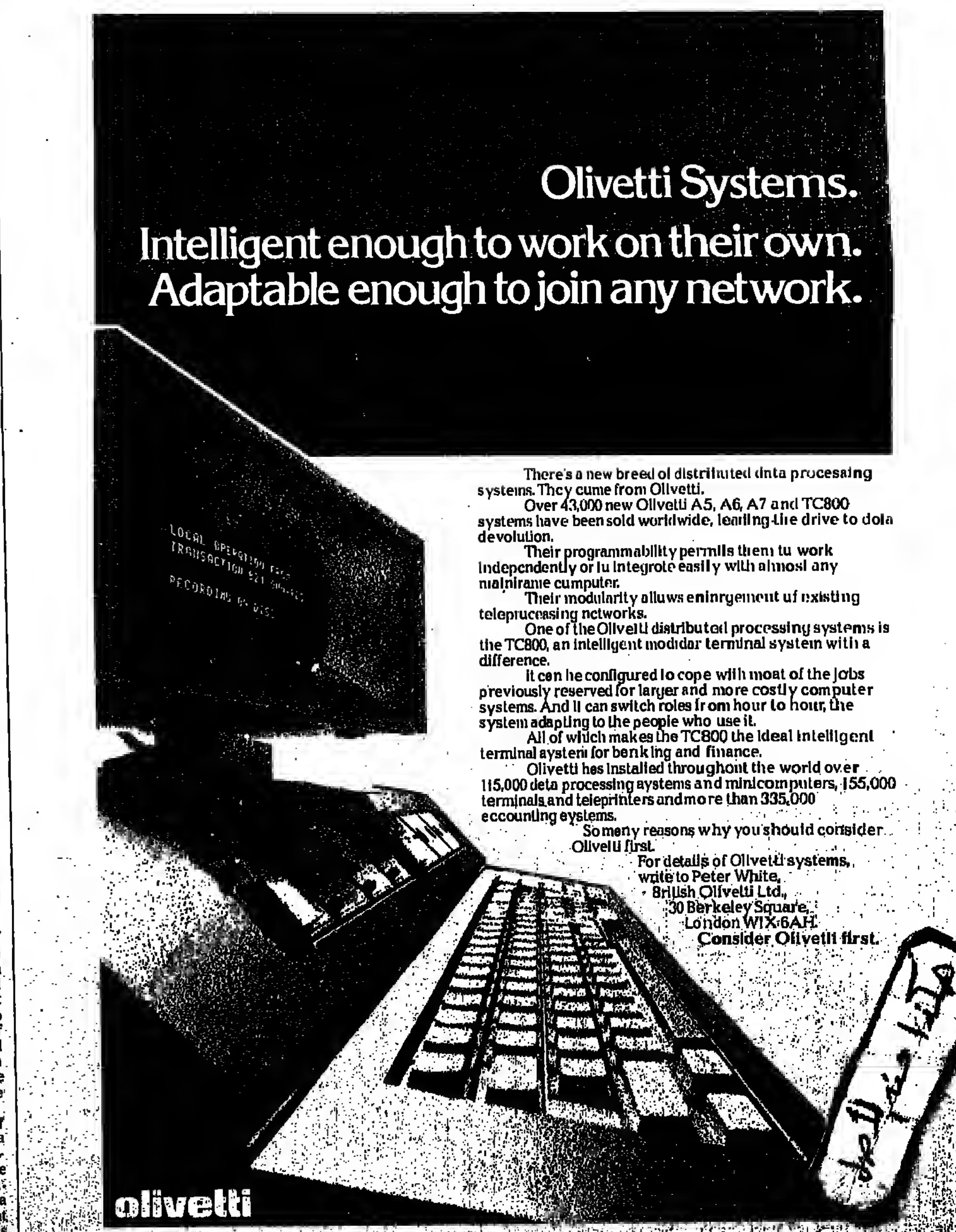
To minimise the misrouting of data to another terminal in the distributed network, some terminals provide a hardware address for terminal identification. To transmit data to a remote terminal from the host computer, the hardware address of that terminal is checked before transmission.

Error correction codes together with communication protocols will reduce transmission errors as well as detecting possible drop-outs of bits or blocks of data.

A cheaper solution to encryption is to use output templates and to code all name fields in records. The end user provides himself with a template to superimpose on the received data which gives the column headings for their proper interpretation. He also has keys to all coded data. For the wire-tapper or after misrouting of data to the wrong terminal, the output will appear as columns of incomprehensible codes.

A password system may be employed for authorised users to authenticate themselves when requesting terminal access. To avoid misuse of production programs and sensitive data files — eg inadvertent modification, fabrication or deletion of transactions, effecting unauthorised changes to production programs — various categories of access privileges may be allocated to staff of different grades with various levels of authority. Such privileges include, for example, authorisation to READ (retrieve only), WRITE (input new data), APPEND (modify existing record), EXECUTE (use program to run job), and COPY (list coding on output).

To render unwanted sensitive documents and data unreadable before discarding, the services of a document shredder may be enlisted. The operation should be carried out under supervision to prevent abuse. The shredder waste should be stored in a metal container with a self-closing lid to minimise fire hazard and should be emptied regularly.



Forget the euphoria – and get down to earth

By Mike Berry

Mike Berry, who is head of computer services at Cadbury Schweppes, examines some of the aspects of distributed processing, and questions whether current or known future levels are adequate for likely commercial needs.

IN the wake of the present euphoria that distributed processing is all we have ever needed, perhaps a little down to earth reality will help redress the balance. It is significant of course that there is no one definition of distributed processing, a fact that in its own right spells trouble.

How many other industries develop a whole range of ill-defined possibilities under a single nomenclature? So, you can have a star system, or hierarchical, pyramid, lateral, vertical, wheel, etc. We do get carried away don't we?

The purpose of this article is to examine some aspects of the technology(?) and question whether the current or known future levels are at all adequate for likely commercial needs.

I am not qualified to speak of the university environment where, with ARPA-like networks, distributed processing had some of its beginning.

One might suppose that the originators of distributed processing expected it to be of some considerable interest to the distribution industry, and certainly my own company has a great interest in it.

With many remote locations, with growing interest in terminal systems, distributed processing offered us the chance of:

1. less dependency on the central system, and main suppliers' teleprocessing strategy;
2. reduced loading on the central system, including smoothing of peaks;
3. more stay-up-ability in depots and factories;
4. natural depot processing staying in depots; and
5. reduction in central cost, and maybe total network cost.

We have been looking at different systems for some two years and have not found our "ideal". As our growing order entry systems increased the load and cost of the central solution, and coincidentally the dependency the remote locations had on high centre availability, so we began to explore what suppliers had to offer.

We quickly discerned that offloading central load needs offloading of file data and here we first question the systems available.

Our need is for remote systems with reasonable size, say up to 30 Mbyte discs, preferably removable packs, with very high disc reliability.

In our situation, with over 70 depots and factories, we would probably have 15 to 30 node systems.

With only a small amount of hardware difficulty we might expect system difficulties at one or two locations per week.

With a desire for "black box" systems where remotely one does not need knowledgeable DP staff, how do you service, from the centre, locations with hardware difficulties? Can you afford the time to replenish a lost file over the network (30 hours for a 30 Mbyte file).

Without distributing data, few inroads into the offloading problem can be made; and, in any event, little effect on central dependency is achieved.

Using the remote intelligence simply to contract messages up and down the line, or to do that validity checking that does *not* need file data, barely scratches the surface of the problem.

You have to distribute your data files. What data to distribute? All of it? Some of it? Master files or only "local" files? If any file is shared by more than one node, where can it be located? If you are distributing copies of master files, how do you ensure they all stay in step?

What file transfer, audit, checking, reconstituting software is needed? What are the logistics of moving large master files to "n" locations each night?

With due respect to the suppliers and the software industry, nothing like enough understanding of these problems is evident. We have discussed these problems with many would-be suppliers but frankly most of them just wave their arms at it.

Continuing with hardware constraints for a moment, apart from the electro-mechanical difficulties already covered, few technology constraints should remain. Any that do are probably *marketing* considerations.

With cheaper store, with microprocessors, multiple if necessary, with sophisticated I/O channel technology, one assumes that most variants are practically possible.

One constraint presently in evidence, although it is software as much as hardware, is the facility of "downstream" terminals. Most suppliers simply do not have the facility.

Those that do usually limit the number of terminals and spurs and in some systems the downstream line protocol is different from that from the node to the host system, usually meaning that the host can never "see" the down terminal.

The effect of these difficult to understand constraints is one of three:

1. More nodes than necessary are required;
2. Small locations have to stand the cost of being mini-node systems, or:
3. Small locations have to stay tethered to the "mother" host system in a non-distributed way.

We have found this constraint an extremely disappointing and irritating one and I am amazed that more has not been done. Perhaps the explanation is that most of these things begin in the US where either "small" outposts do not exist, or people do not worry about the cost of equipment as much as we Europeans do.

Pulling a couple of threads together let me return to the distributed files problem. (Incidentally I have deliberately refrained from saying distributed databases – that is a whole new area of technology – to presuppose we can safely distribute true databases when we cannot adequately construct and control centralised ones is, to say the least, [illegible]

Many of the potential suppliers we have spoken with have preferred distributed systems that are largely self contained with a simple batch exchange at the end of the day with the centre. It may just be semantics but this is surely decentralised processing. In any event, the popularity of this offering is probably explained by noting that most suppliers have long since had remote job entry work station systems and were well able to jump on the distributed processing bandwagon with the same level of technology.

However, they were not so ready to offer 3270 VDU-like access to the host system.

Ironically these suppliers were quite strong on discs and file processing where the plug compatible VDU brigade were, until recently, not at all strong on discs and files.

While the batch exchange method suits some users, presumably so as many are using it, it did not suit our environment at all, principally because of the share file problem previously mentioned.

In determining which files to distribute, notwithstanding the many problems, we decided to hold shared records at the centre – for example customer records for national customers that could deal with any depot, or stock records of shared warehouses.

Thus we developed a need for the remote node, usually supplying its transactions with data from local files, to detect situations where it could not satisfy the request and to dynamically access the host, transparently to the remote operator, save for a delayed response.

This one seems to have caused more turmoil in our potential suppliers than any other need we have expressed, and certainly sorts the men from the boys.

We have found but one or two systems that can provide truly dynamic access, per terminal, in this way. Some can force it if the operator knows in advance that the transaction needs it, but this is not always possible.

If one compounds this need with the need to drive and maintain similar dynamic accesses for downstream VDUs, then a complete solution does not exist.

Thus far then, I have recounted a view of present hardware, software and application technologies, emphasising transaction based commercial systems.

In my *company*, and I suspect in many others, there is a growing use of remote job entry workstations and interactive time sharing terminals.

Suppose now we wish to map these on to the same network, or perhaps in some cases actually use the same terminals as the main transaction terminals.

Now one needs a remote node system, with downstream VDUs, with addressing and routing facilities that at one time can recognise that the terminal wants access to local data, at another that it wants dynamic access to host data, or that at another time it wants to open up a "session" with the host in remote job entry or interactive mode, this time using the node simply as a staging post.

How many systems do you know that do all of these things? If it needs the full might of over-engineered solutions like SNA, then we have got it wrong.

Of course, an alternative solution is a do-it-yourself approach using minicompu which may already have d protocol compatibility with mainframe.

We have considered this pos sibility, as have many oth companies, and many ha achieved success. A constrai in our case is that we are m more concerned to get systems going quickly and s ly and the do-it-yourself rou neither of these.

Disciplined applica approaches do not exist; while software houses were quick as any to get with i terms of distributed processi their "expertise" is wafer th and track records variable.

Time to agree standards

● From page 15

confidence in. Indeed there ha been many recent cases wh such systems have be *abandoned*.

The need for centralis superschemas is obvious if t total database is large. But i grossly impracticable to s most of the system's updating distributed supersc mas about the place. On t other hand, data integrity m well suffer.

A possible, but probab unsatisfactory compromi might be to avoid real t updates altogether and, inst cumulate all file activities o separate log file and then p form a complete system upd at regular pre-determin intervals.

You have to keep the log anyway for recovery purpo for the system must have in-built check-point backtra dump file somewhere.

It should be observed th distributed systems are by th nature less prone to full crash but care must be taken by th designers to provide that system degrades gracefully successive components bre out.

Other points about distribu systems which should be so are the needs for all applicat software to be completely written. It is disastrous attempt to bodge existing ba and interactive software DBMS, let alone distribu systems.

The philosophy of file acce and design is completely dif ent. The security and priva aspects are easier to hand though, because the individ processors are normally working on one or two simultaneously.

Therefore it becomes easier to detect unauth intrusions into secure areas, and it is a simple to bury the location of sensitive data in some site.

A worrying aspect of d buted systems design currently developed is the area of compatibility standa The two major suppliers hierarchical systems, IBM Honeywell, have already radically different solutions

The views stated in this article [illegible] author's own, and do not [illegible] represent the views of [illegible] Information Systems [illegible] The Author [illegible] Technical Consult [illegible] mation Systems.

All change in the next few years

By John McNeil

Distributed processing is currently based on established technology, but in the long term new micro technology will be of fundamental significance, says John McNeil, a managing consultant at systems house, Data Logic, and a member of the Science Research Council's computing science committee.

IN its earliest commercial applications the microprocessor has tended to follow in the well-trodden tracks of its larger and more expensive predecessor, the minicomputer. The formula is straightforward: apply the new devices to much the same tasks as before and in much the same kind of ways, but do it rather more cheaply. Were it to offer no more than this, micro technology would still be of considerable significance and would open up a host of new computer markets. However, in the longer term, the new technology will prove to be of more fundamental importance.

It is, for instance, likely to alter radically the hardware and software architectures of what we presently call mainframes. As a consequence, it promises to change both the ways in which computer facilities are offered to the user and the range of applications of computer systems as a whole. We can perceive some of the possible future directions only dimly at the moment but they are none the less exciting for that.

Many of the applications of the future will be based on some form of distributed computing. This term is widely misused, being commonly applied to systems which are in some way geographically spread. Perhaps as a result, there is a correspondingly wide misconception about the present state of development of distributed computing. It is on its way but, in the strictest sense of the phrase, is not yet with us.

The increasingly accepted definition of a distributed computing system is one in which there are several autonomous but interacting computers co-operating on a common problem. The computers may be co-located or may be geographically separated. On this basis, a system with dispersed elements is not necessarily a distributed computing system.

Is it really necessary to be so strict in definition? I would argue that it is, in order to be aware of the nature of distributed computing, its problems and its promise. The mere fact of geographic dispersion of system elements presents one set of challenges which, as many operational systems demonstrate, can be met successfully if not optimally by the application of conventional hardware and software techniques. Concurrent processing poses a quite different set of problems. It is essential to be precise in our terminology to make the distinction.

A simple example will clarify the difference between *distribution* and *separation*. Until recently, mainframe designers have had two main ways of increasing computer power. One, self-evidently, was by increasing the complexity of the CPU hardware and device controllers in the context of a single-processor configuration. Generally, this implied a corresponding increase in the complexity of the software operating system. The other avenue was to add further processors to a common main memory.

Micro technology now offers the potential for a third approach: the use of multiple computers; ie, pairs of CPUs with dedicated memories. A prime motivation for the manufacturer in adopting this route will be the ability to produce a range of computers, with power closely related to price, from a limited number of standard building blocks. To achieve systems of this kind, what some designers are calling federated computers, will require developments in two main areas.

First, we need greatly improved interconnection technology. Interfaces and their supporting software must become like the microsystems they will link — cheap, efficient and flexible. Second, system control software must change to exploit the new architecture.

At Xerox PARC, Xerox Corporation's Palo Alto Research Centre, considerable effort and funds have been devoted to the implementation of experimental distributed computing systems in recent years. An early attempt was Pogos, employing 25 Data General Nova computers, intended to operate as an integrated system. Pogos was dropped when the elegantly simple control principles were found to be unstable in practice. It is a fair bet that other future test-bed systems will encounter similar problems of instability.

Currently, the main thrust of PARC is on the implementation and study of the Ether Net, a connected system of some 100 personal computers. Generally, this work is held in some awe by other researchers in the field.

In the country, the Science Research Council's Computing Science Committee, recognising the importance of distributed computing, has taken the unusual step of launching a co-ordinated programme of university research in this area.

Currently, some 10 British universities are engaged in projects relevant to distributed computing and it is hoped that more will have research proposals approved in coming years. Under the energetic and enlightened chairmanship of Professor Iann Barron, the SRC's working panel on distributed computing identified six main areas for research. Here it is possible to touch on just some of the topics requiring investigation under each heading; and to mention only some of the researchers who are studying the problems.

● There is clearly a need to develop an adequate theoretical basis for distributed computing. Present high level languages are highly sequential. There is scope both for modification and for wholly new languages which address the problems of non-sequential processing. At the University of Warwick, a team under Dr Colin Whitby-Strevens will be implementing and exploring the use of a new language, EPL, developed at Warwick by David May.

● Multiple computer assemblies will demand a new approach to the control and allocation of resources. The problems apparent in present single-processor database systems will be exacerbated when one computer requires access to information controlled and organised by, perhaps, many others.

● There is a need for greater understanding of how best to link computer arrays. There is, too, scope for research into means, such as dataflow techniques for increasing the power of individual processing elements. At Swansea, Professor David Aspinall has for some time been studying the interfacing problems posed by arrays of microprocessors. At Edinburgh, Nick Shelness has begun investigating an architecture intended to function as an integrated whole under decentralised control. Unlike some earlier decentralised control systems in the US, Shelness' approach allows programs as well as data to migrate from computer to computer.

● Among the topics for work here are the development of procedures or aids to enable designers to decide when to employ distributed computing, and how to structure their systems. Much work needs to be done on the means of deploying local intelligence under the control of the system user. At Queen Mary College, a team under George Coulouris is devoting its attention to the ergonomics of highly intelligent terminals, workstations, and to the best means of implementing their software.

● Distributed systems promise very high robustness, due to the potential provided by their structures for the containment of errors. But other aspects of their design threaten to offset this advantage. Work is required to explore and resolve this conflict.

● The promise and problems of distributed computing are not solely technical. We need to be aware of the likely penetration of future systems into wholly new fields in order to plan for them adequately.

Some of the topics may seem at first sight to be highly theoretical and well removed from practical computing. But computing as a whole is now set on a course which will change every aspect — hardware, software and applications — within a few short years. Both the designer and the user, whatever their current areas of interest, should be aware of the work now being set in motion in British universities and would do well to follow the results when they begin to appear.

Second bureau for Isle of Man

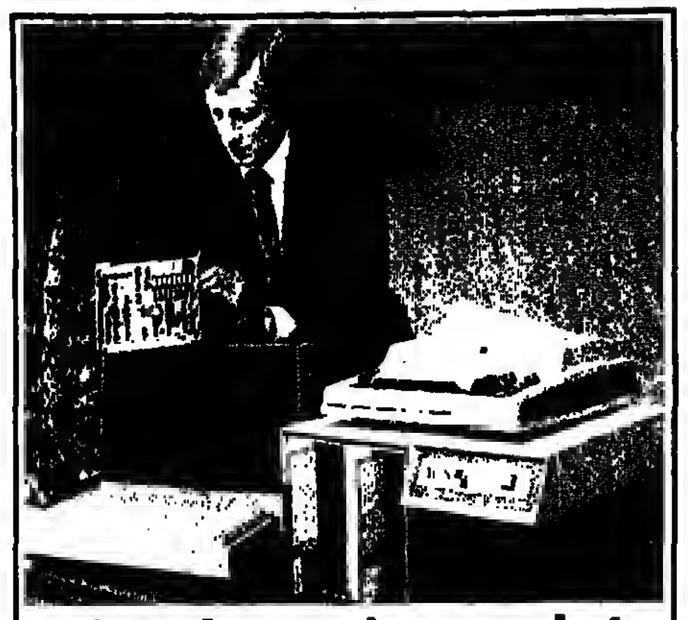
A SECOND computer bureau, running a Prime 300, has been set up on the Isle of Man. The company, Island Business Consultancy, is only the third Manx organisation to get a computer bigger than a small office system, the others being the Island's parliament, which has a Univac 90/30, and Manx Computer Bureau, with a Digital Equipment PDP-11/40.

Island Business Consultancy was formed two months ago and began by using computer time bought from a London company. An in-house machine was needed because the communication costs were more than the processing costs.

Richard Cochrane, head of Island Business Consultancy, said there was room on the Island for two bureaux as long as they did not get too big. "There will be a lot of small local bureaux in the future bringing computer power to small companies," he said. "The big bureaux will have the problem of communication costs."

Island Business Consultancy is the eighth bureau to get a Prime computer this year. Cochrane said Prime was chosen because the amount of power available for the price made it highly competitive.

The bureau is offering standard accounting and payroll services on the machine.



ACS explores micro market

Applied Computing and Software has taken delivery of this Zilog Z-80 MCB microcomputer as the first step in an exploration of the market for micro-based systems.

The system includes the Z-80 CPU, together with 500K bytes of disc, 32K bytes of dynamic RAM and 3K bytes of PROM, and contains a system debugger, floppy disc driver, console drive and bootstrap routines. It also includes a VDU and serial printer.

Initially, it will be used for evaluation and application development work to meet the requirements of applications which ACS has already identified in the freight forwarding and factory data collection areas.

ACS intends to develop complete systems for clients, and anticipates that a single microcomputer-based system with one application package, will be available for about £10,990, while a system based on one mini and four microcomputers, with one application package, will be well under £100,000.

Slowdown in US govt DP growth

ONE of the most important factors in the growth and dominance of US computer manufacturers has been the enormous exclusive market provided by the US Federal government. However, statistics published for the first time by the US National Bureau of Standards indicate that the central government market is now growing at a slower rate than the US market as a whole.

In the financial year to July 1975, there were more than 8,000 computers worth $4.04 billion, in use in the federal government. In the same year there were over 190,000 computers in use throughout the US with a value of $35.7 billion. The number of computers in the federal government is increasing at a greater rate than the dollar value of the computer systems and will probably continue to do so. Meanwhile the number of computers in the US is increasing at a rate twice greater than the rate of the growth of the dollar value of the installed base.

Computers in the federal government as a percentage of total US installed base has dropped from 10% in 1967 to less than five per cent in 1975, but the dollar value of these systems is high; it dropped from almost 13% in 1970 to about 11% in 1975.

The Defence Department continues to be the biggest user.

Over the last eight years federal minicomputer inventory has grown at an average yearly rate of 22%, and now represents about 55% of the total.

Further integration at Univac

THE new Univac Minicomputer Operations division, formerly Varian Data Machines, is to be integrated into the Univac subsidiaries immediately in Australia and Canada.

In Europe, Rune Nyman, newly-appointed general manager of the Office Equipment Division of Univac, will be in charge of deciding the rate at which the MCO divisions in the various European countries will be merged with the Univac marketing operations.

In the US, however, MCO will continue to operate as it did prior to acquisition by Univac, except that maintenance and customer engineering will be merged with those of Univac. Manufacture and development will continue to be based at Irvine, California.

Racal-Zonal to diversify

UK magnetic tape specialist Racal-Zonal of Redhill, Surrey, is to diversify its range into four new new lines of magnetic media for the minicomputer, microprocessor and terminal markets.

It is now offering floppy discs with an oxide coating designed to minimise surface friction; digital tape cassette conforming to ANSI, ECMA and ISO standards; a quarter inch tape cartridge carrying up to 2.8 Megabytes in ANSI format and 204,000 bytes in IBM format; and a magnetic card for the word-processing and office automation markets.

The acquisition of Hellermann Cassettes of Crawley, West Sussex, has given Racal-Zonal a fully integrated cassette plant.

Another member of the Racal group, Racal-Milgo, has announced that the recently-acquired Milgo Corp of Florida is to be merged with the Racal-Milgo Inc subsidiary.

Racal-Milgo has just introduced a 56K-baud full duplex modem buffered for transmission over satellite channels Called the 56K, it is claimed to offer exceptionally low error rates.

More powerful processing

ENHANCED capabilities for the programmable Delta 4300E video text processor have been announced by Delta Data Systems.

The 4300E has a 4.5K memory, expendable to 8.5K, four display modes, ragged right justification, and a search function that allows the operator to search text for a specific word or word-string, and if required, replace or delete it.

Other features are a programmable keyboard, full 128 upper and lower case character set, and a V24 interface enabling remote or local CPU connections at speeds of up to 9,600 baud.

Amdahl European centre

● From front page

company will look after southern Europe.

Amdahl has very small sales operations in Switzerland and Norway, and these will be controlled by Germany and the UK respectively.

Charles said that Amdahl (UK) has taken on six field engineers, five of whom were at present in the US being trained. Software people were now being hired. The company had also talked to a couple of candidates for the job of UK general manager.

Datasolve's move to Amdahl follows news of the delivery schedule for IBM's 3033 processors (CW, August 11). Datasolve has a 3033 on order but the machine will not be installed until the end of next year because of the long delivery delays caused by large numbers of orders. The company said it needed extra capacity urgently and chose the 470 after looking at alternatives. It is understood that those alternatives included a 370/158 and an Itel Advanced System.

Meanwhile, Datasolve and the Edinburgh bureau Systemshare have become the first two European companies to get a Honeywell 66/07. Systemshare's machine was installed last month while Datasolve expects its 66/07 to be live in Birmingham by the end of this month. The 66/07s are made at Honeywell's factory in Newhouse, Lanarkshire.

DIY prices still dropping

● From front page

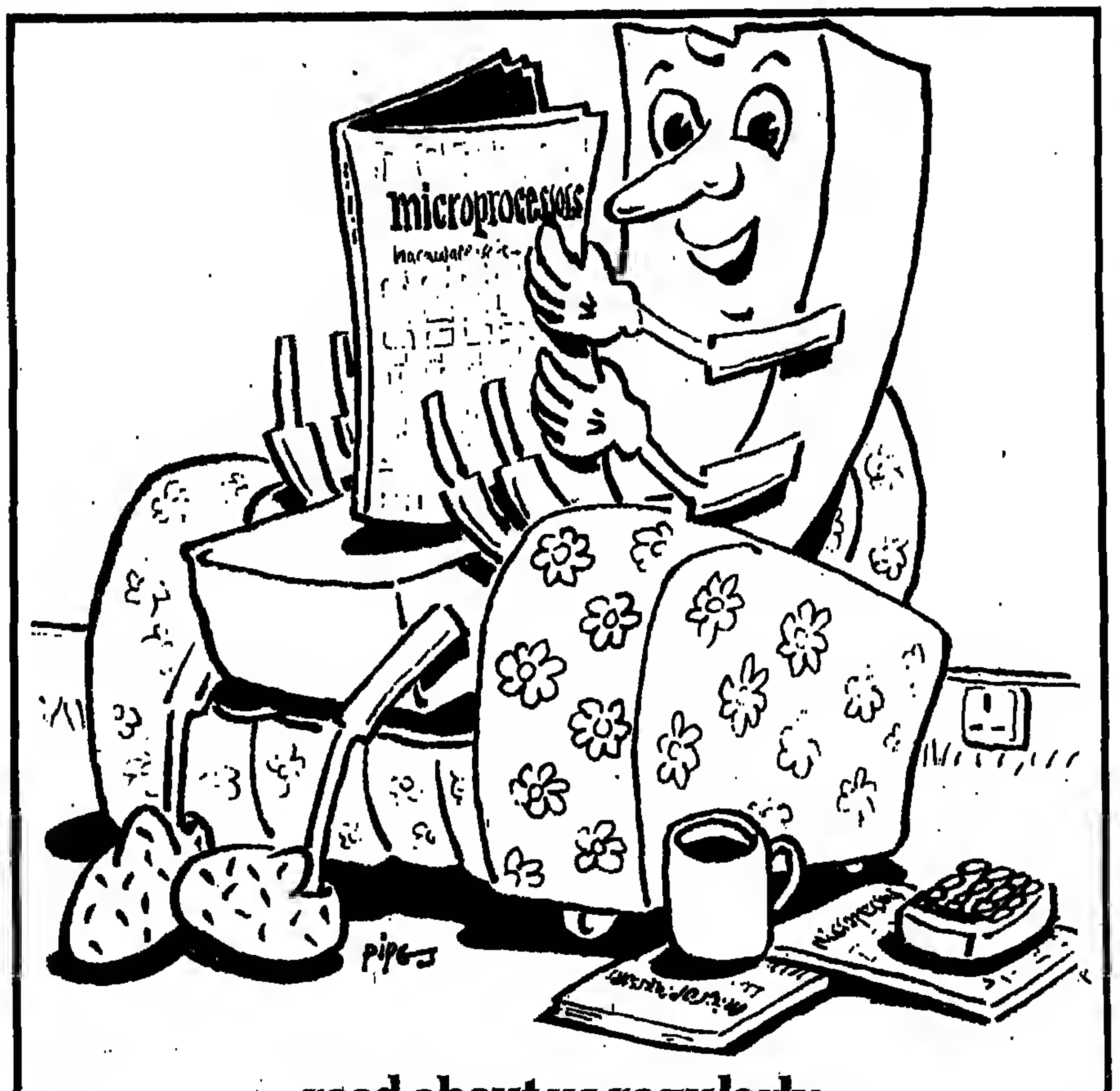
whose personal electronic transactor, Pet, domestic computer was launched in the UK in May.

Originally expected to be available next month, the system is now scheduled for early next year. The quoted price for Pet remains at £600, but Commodore says this might well drop by the time it is introduced.

Pet is based on the 6502 eight-bit microprocessor made by MOS Technology Inc, and comes complete with a VDU and alphanumeric keyboard. Programming is in Basic using audio cassettes for storage.

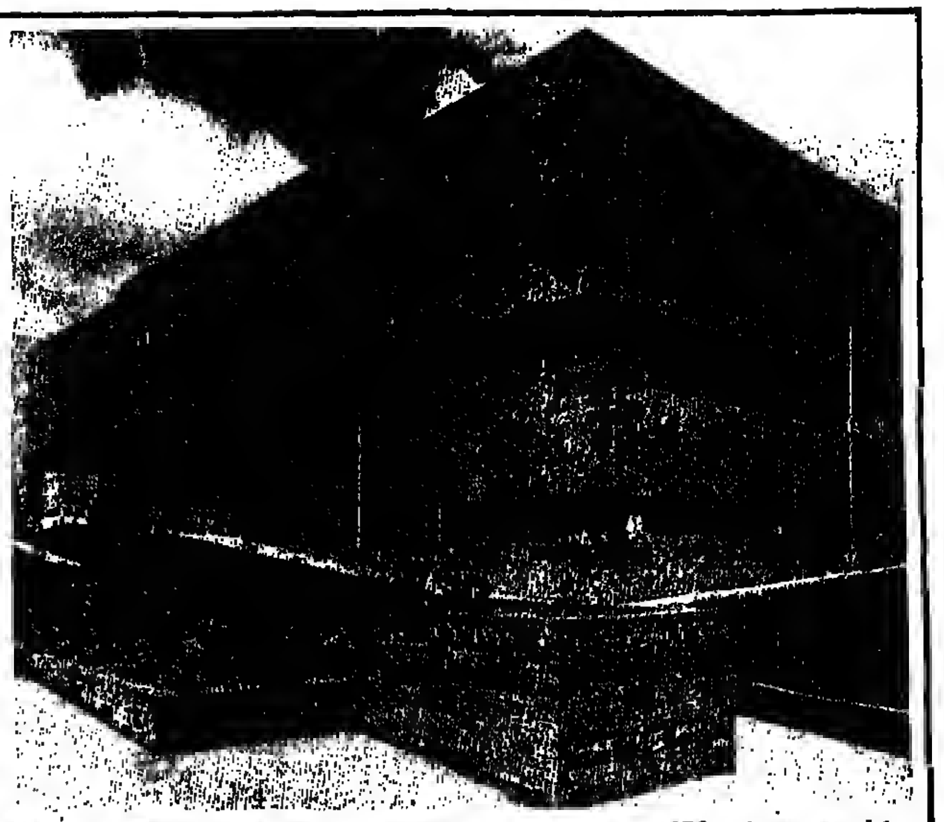
The 20 per cent reduction announced by Pertec on the Altair range is a result of improved manufacturing efficiencies by MITS, the manufacturer, following its [illegible] tion by Pertec (CW D[illegible] 16/30, 1976). The 8800B [illegible] down to $750 in kit form, [illegible] the fully assembled 8800 [illegible] 18 board slots will cost [illegible] Similar reductions have [illegible] made on 680B kits [illegible] assemblies.

Martin Underwood, [illegible] director of UK Altair [illegible] Compelec, said the [illegible] tions would be reflect[illegible] country from next mo[illegible] systems with the [illegible] would be on show [illegible] new North [illegible] Centre, which op[illegible]



Dr Richard Horsnell, managing director of Philips Data Systems, tells John Kavanagh how re-organising support services and careful selection of new products has put the company on a firmer UK footing

Suppliers of solutions to problems



Philips Data Systems' head office, at Colchester, was completed in 1974 and accommodates the central sales, administrative and technical staff.

LAST year Philips Data Systems increased the productivity of its UK salesmen by 39%. In the first six months of this year it has increased it by another 33%.

These statistics can be interpreted to mean that more people have been bothered by Philips salesmen over the last 18 months, but the company believes that the figures reflect its approach to ensuring customer satisfaction.

"We don't see ourselves as hardware suppliers but as suppliers of solutions to problems," says Dr Richard Horsnell, managing director of Philips Data Systems in the UK. "No doubt our competitors would say the same, but are they organised to provide the applications software, the customer training, and our midwifery approach of getting a system born and live sucessfully?

"For every one of our 80 salesmen we have two software people, two-and-a-half engineers and one administrator."

"In some companies it's the salesman's job to interpret and meet customers' needs. At Philips it's everybody's. Five years ago, engineers did electronic repairs. Nowadays our engineers don't talk about diodes and bits — they go in and talk about the customer's payroll system."

As far as products are concerned Philips believes it now has a coherent range for the bottom end of the market. Customers can start with a 310 accounting system at £7,000, add a magnetic stripe reader and a cassette drive to move up to the model 320 and now add four newly-released floppy disc drives and a line printer.

From a 320, customers can move to a 410 with cassette tapes, magnetic stripe reader, up to four 10 Megabyte disc drives, four display terminals

Managing director, Dr Richard Horsnell . . . midwifery approach of getting a system born and live successfully.

and two line printers. This system can handle four programs and has a Cobol compiler.

Where do users expand to after that? "Hopefully to two 410s," laughs Dr Horsnell. "The UK is lucky to have its own computer manufacturer in ICL, which provides strong competition higher up the scale with the 2903 and 2904. That is why we have chosen not to market our 440 and 450 in this country.

"Besides, 80% of businesses in the UK can be catered for by hardware in the £14,000 to £18,000 range, and our range meets the computing needs of 95% by number of all UK businesses."

The ability to provide complete problem solutions is vital to Philips as 80% of its customers have no professional data processing staff.

"We have 200 application systems, training tools and support services which allow the businessman with no professional computing staff to harness computer power," says Dr Horsnell. "Almost 80% of the application systems go in unmodified. And it's not just small users who are buying our systems, as we are getting orders from a good number of big companies which are moving into distributed computing. They, too, are coming to us because of our software."

How is Philips Data Systems getting on financially? The last figures available showed that in 1972 the Philips group lost £27.5 million on computer activities. Since then separate figures have not been given for individual divisions within the group.

Dr Horsnell gives nothing away either, but he points to Philips' withdrawal from the mainframe business two years ago (CW, September 11, 1975) and says the move released capital for a major push into the US.

"Philips Data Systems does 80% of its business in Europe, but 42% of the market covered by its products is in the US. So we have started a major development programme in the US, with products specially designed for that market. For example, magnetic ledger cards have never been accepted there, so we are developing more products with floppy discs."

With its support services completely reorganised and having shed the money-consuming mainframe business, Philips Data Systems seems to be on the right road in the computer world. And with the intelligent choice of products which the UK arm has made for its own market place, its aim of increasing its share of the UK business from 18% to 28% by 1981 does not look too optimistic a proposition.

Philips users can now move gradually from a 320 visible record computer to the disc based 400 series by first enhancing a basic 320 (left) by adding a new dual floppy disc unit (centre) and an 80 lpm printer (right). The library of 200 applications programs is compatible with both the 320 and the 400.

Air Canada plans link-up with travel agents

AN unusual approach to designing an airline reservation system has been made by Air Canada, with the Reservec II system, centred around a Univac computer system at its Toronto headquarters. In addition to holding information on its own flights, Air Canada also operates reservations facilities for most regional airlines operating in Canada.

Air Canada is pioneering a form of distributed processing for airline reservations, by placing VDU terminals in the offices of travel agents, thus relieving the airline of physically making the booking.

At present over 300 terminals are installed in travel agents' offices throughout Canada, and by the end of this year the figure is expected to top 400, with projections calling for 800 by 1980.

The number of travel agents equipped with automatic ticket printers will also be increased, and it is hoped that at least 20 agents will have printers by the end of this year.

Air Canada is pioneering the introduction of "one call does it all" system for travel agents, because the Reservec II reservation system is module constructed, and enhancement is relatively easy.

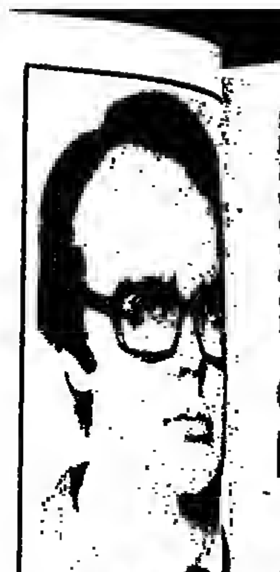
System supports 15 devices

A LOW-COST hardware and software computing package for use with laboratory instruments has been introduced by Digital Equipment. Called DECLAB-11/03, the system is based on the PDP-11/03 minicomputer with large scale integration technology, and can support 15 laboratory devices.

Two versions are available. One, at £10,700, has a DEC LA36 teleprinter while the £11,500 model has a VT55 graphics display. Each version has a floppy disc drive and is supplied with a scientific software routine for data analysis.

Options include analogue-to-digital and digital-to-analogue converters, a programmable real time clock and extra memory and peripherals. Software options include multi-user Basic and Focal, a high-level, easy-to-learn language.

How lack of maintenance can take its toll of DP budget



Mainframes and peri rals get plenty of care a attention, but magne tapes and disc packs a often misused. In th article Richard Evan director of C&E Compu tar Media Services, co siders some of the co that lack of maintenan can impose upon the budget. Whether mai tanance is done in-hou or by a specialist co pany it can help to ens more efficient operatio at less cost, he says.

IT'S strange but true — the computer installation which spends thousands of pounds on preventive maintenance for its system, which is processing data, will often spend not one penny on maintaining the devices on which that data is stored.

The operator, who will treat a console of flashing lights with care and consideration will, equally, handle a disc pack or magnetic tape like a rugby ball, and expect it to be just as resilient.

One of the most obvious causes of these apparent contradictory approaches is the relative cost of the various items of computer equipment. While a CPU will, even in the smallest configurations, dispose of tens of thousands of pounds of the computer manager's hard fought-for cash, magnetic tapes of disc packs are, generally, expense items.

Unfortunately, the expense items can rapidly become expensive items if they are not handled and maintained with the care and consideration commensurate with their real value to the installations.

The real value of the data on each of the tapes or disc packs within an installation is best judged by the DP manager, but it will, in all instances be grossly out of proportion to the cost of the media on which it is stored, and, while most (no, not all!) installations keep back up material, this is rarely, if ever, as complete as the live file, so any value fixed to the data, must be weighted with the cost of re-creating that data in the event of a complete loss.

The first natural retort to such an argument is, "We have never had a disc head-crash," or "We have never damaged a reel of tape."

Thankfully it is true that complete losses, such as these, are not common in the majority of sites; however, problems caused by incorrect handling and non-existent maintenance of magnetic media still constitute a major expense in the DP budget, although it may not be instantly visible to the DPM.

To better understand this, it is necessary to explain just what causes errors in magnetic media.

An error is recognised when a bit fails to occur at the time the system expects it to occur, or occurs in a different form. This normally results from a change in the head-to-surface relationship on the drive.

In magnetic tape transport systems, the surface of the media must be maintained in intimate contact with the drive head to ensure that such errors do not occur. If a particle of dirt or an area of damaged tape causes the surface to break contact with the head, then the resultant air gap will cause a distortion or complete loss of the signal in that area.

In disc pack systems the head has a carefully controlled air gap between it and the surface. Any contaminants between the head and the disc can cause, at least, a data check, and at worst a head crash.

The contaminants need not be large: a particle of dust of 100 millionths of an inch is sufficient to cause an error on magnetic tape, and could easily cause a head crash on a disc drive.

Although system manufacturers are building in error correction capabilities, these, in most cases, cause a loss in computer time which is invisible to the user, and therefore, is in some respects worse than the losses that can, at least, be seen and accounted for.

So what can be done? How can these losses, both visible and invisible be minimised? This can be achieved by:

e. Operator and Supervisor training in care and handling methods and procedures.
b. Greater awareness of environmental control, including the exclusion of such obj contaminants as food, d and smoking materials f the computer room.
c. Regular inspection of m
d. Regular cleaning of media
e. Control of library quality periodical re-certificatio re-initialisation.
f. Incorporation of corre designed storage racking the computer room.

Obviously, all of these p cautions cost money, whe they are carried out by operations personnel thems ves or one of the specialist f such as ourselves, so the must be justifiable in terms the savings.

It has been calculated th recoverable data check between 2p and 10p in sys time. If we take the lo figure, and multiply it by number of recoverable d checks on a tape we will ge figure for the cost of errors tape or pack. This will occ each time the tape or pack loaded.

While it is difficult to defin average, 30 recoverable d checks per tape or pack wo not be an unreasonable figure.

Therefore, a tape or disc pa can be presenting an installatio with an average of 80p p loading in hidden or parti hidden costs. Multiplying by th total number of loadings p week gives the total costs.

These costs are necessari rough, and do not include th consequences of either a perma nent data check or comple failure. The cost of preventi will vary dependent upon th method used, own personnel specialist firm, but using specialist firm (which for mo installations, is the most eco mical) the costs can be as low 25p per pack or tape per week.

Most of the cleaning metho used are 75 to 80 per ce effective, therefore it can b seen that on cost alone, th introduction of such a schem can greatly reduce the run costs of an installation.

These costs are only a part the usefulness of such programme, as it will also se to improve the reliability a efficiency of the system, incre se the life span of the medi thereby reducing replaceme costs, and produce a peace mind afforded by the knowle that the chances of disast such as a head crash, have be greatly reduced.

NCR 7400s for NatWest

ONE thousand NCR 7400 proof encoders have been ordered by the National Westminster Bank in a deal valued at £1.5 million. The desk-top encoder is microbased and features check digit verification and generation [illegible] programmable format, four pro grammable totals and [illegible] saction log that provides har copy on a journal tape. Delivery of 500 7400s will place this year.

Sewing thread manufacturer H. Greenberg Ltd, whose biggest customer is Marks and Spencer, became computer users almost by accident. Managing director Geoffrey Greenberg admits that, when he called at DEC's local office to see the PDP8A with floppy discs, "no doubt they thought I was crazy as it must have been obvious I hadn't a clue about computers. All of us were as green as grass." But LAURA TATHAM describes on this page how intelligence and enterprise have led an initially naive computer user to design and install systems that are probably at least as effective as could have been obtained from other sources, and are uniquely suited to the company's needs.

Success story of the firm that 'hadn't a clue about computers'

Managing director Geoffrey Greenberg (left) discusses the computer installation with Albert Jackson.

WHILE the average company installs its first computer systems only after agonising decision and anxious planning, H. Greenberg Ltd, sewing thread manufacturer, joined the ranks of users almost by accident.

What is particularly remarkable is that the company, which began from a position of total ignorance, is using with conspicuous success a number of self-designed business and technical programs. These are processed in time sharing mode through exploitation of a little known operating system originally designed for use in an educational environment.

How all this came about is described with refreshing candour and humour by Geoffrey Greenberg, the company's 33-year-old managing director.

"About three years ago, we were looking for a way to record automatically the output of some test-kit we had designed to monitor the performance of our threads in a sewing machine. I imagined we'd probably need some kind of a black box that would link our equipment to a printing calculator."

"It happened that a friend of mine, Albert Jackson, was working at that time with Computer Field Maintenance, so one weekend I asked his advice. Jackson, whose previous experience was with hardware only (Leo, KDF9, PDP8s & Comms) had, about five years earlier, taken an HND in electronics, including some Algol programming. His suggestion was that the best answer would be a second-hand PDP8 with A/D facility."

"We then began talking about other operations within the company and evolved the idea of having a system that would allow us to computerise quality control and product costings. I then invited Jackson to join the company and set it up," said Greenberg.

Within a month the intending computer users visited DEC's local office to see the PDP8A with floppy discs. "When I'd had a look at it, I said, 'OK, I'll have one', Greenberg told me with some glee. "No doubt they thought I was crazy as it must have been obvious I hadn't a clue about computers. All of us in the company were as green as grass," he continued, enjoying the pun. "But I thought if using a computer was going to improve the way we worked, we should have a go."

Inexperienced in computing Greenbergs may have been, but this naiveté certainly did not extend to its own field of technology. Nothing, perhaps, is more indicative of its expertise than the fact that Marks and Spencer is by far the biggest buyer of its industrial sewing and embroidery threads. All its products come up to exacting standards, and quality control is rigorous.

The R & D department is unusually inventive and well equipped for a company which employs only about 60 people in a single factory just outside Manchester. The company, which operates in an extremely competitive market, has increased its turnover by 40% per annum since 1974, when Geoffrey, son of the founder, assumed control.

"We decided to tackle the costing system first," Greenberg told me. "Prices move very quickly these days and we manufacture a wide range of products from a lot of different raw materials that must be ordered long before we use them. It would obviously be useful to have a fast, flexible and reliable system that would recalculate our costs at any time."

Pending delivery of the computer in October 1975, Jackson had taken the opportunity to familiarise himself with the OS/8 operating system and to learn to program in Fortran. By December that year, six months after joining Greenbergs, he had converted an Algol costing program to Fortran and had written his own programs for stock control and quality control.

The manufacture of sewing and embroidery threads is a far more elaborate process than the layman might suspect, involving a long and complex series of operations that begins with the preparation of filaments of raw material and ends with the heat setting of dyes. Greenbergs make about 200 varieties of product when colour is taken into account.

Samples are taken frequently at various stages of manufacture and are sent to the quality control laboratory. There they are subjected to up to 20 tests for such properties as tensile strength, adherence to colour standards and fastness of dye.

Results of these tests had always been handwritten in large books, a recording procedure that was tedious, laborious and error-prone. Its worst drawback, however, was the lack of any mechanism to reveal immediately any undesirable trends which, allowed to continue, could lead to wastage.

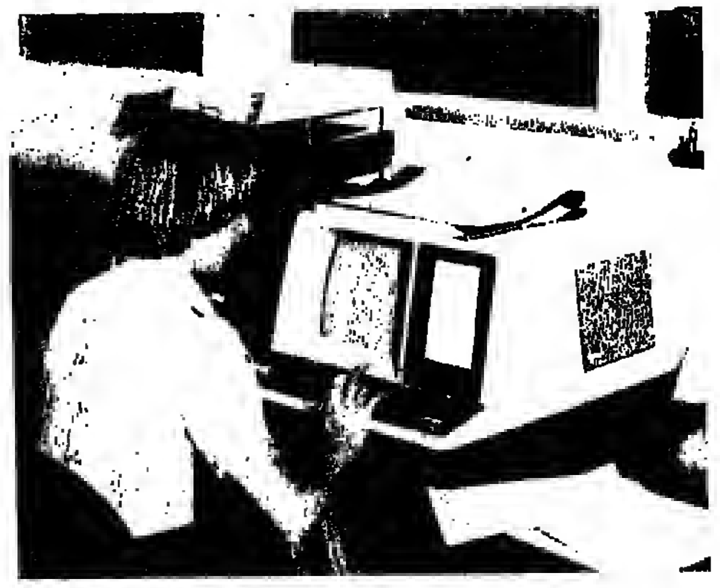
While obvious defects in the products are spotted during manufacture and their causes remedied on the spot, it is not possible to detect a gradual fall-off in quality arising from, say, machine wear. These slow drifts could also go unnoticed in the quality control laboratory, since it was very difficult to discern them in the mass of test data and in practice the technicians relied mainly on their memory of previous results.

Acquisition of the computer offered an opportunity not only to collect the test data online but immediately and exhaustively to analyse it and to produce exception reports.

Plans were therefore made to put the tensile test equipment online and to install a terminal so that the quality control technicians could key in other results. Programs written by Jackson compare input data with up to 28 sets of previous results held in online files.

Reports on significant deviations from standards are produced daily as histograms. This system is now in use and has been enthusiastically accepted by the quality controllers because it not only reduces their clerical work but significantly improves their efficiency.

It had become apparent, however, that before this program could come into operation or plans made for any further applications, a more powerful computer with conventional disc storage would be needed.



One of Greenberg's production co-ordinators keys in an order.

Having got word that DEC was offering favourable terms on the PDP8E system it was then using, Greenbergs decided to buy it.

The PDP8E configuration Greenbergs is now using has 32K of core, four 1.6 megabyte disc drives (one pair DEC, the other Plessey), two LA36 DECwriter teletypes and a 16-channel analogue-to-digital converter.

The latter is used in conjunction with the tensile strength test equipment in the lab and will later also be used for the sewing machine project which has been deferred in favour of more urgent applications.

Two video terminals and one LA180 matrix printer are plugged into a well mounted patchboard, an arrangement that allows the terminals to be moved from place to place at any time.

Then a serious snag cropped up. Since it had not occurred to either of the new computer enthusiasts to discuss with DEC in any depth their plans for the PDP8E, they had not realised that the OS/8 operating system alone could not support simultaneous processing of two or more online programs.

Seeking a solution to this problem Jackson contacted a large firm of architects which, he had heard, had tested an early version of a time sharing package that provided every user with a virtual OS/8 system. Known as ETOS, this software had been designed by Educomp Corporation of Hartford, Connecticut.

As there were no other UK users of ETOS, Greenberg decided to visit Educomp in the US. ETOS, he learned, requires an omnibus PDP8 with a minimum of 16K words of memory (and preferably 24), clock, and RK8E control with two disc drives. Educomp provides a time share control module, the ETOS monitor and a number of language compilers. The system will operate with OS/8 or other operating systems.

Although, he maintained, some of the technical detail went over his head, Greenberg was confident that ETOS, though used to date mostly in educational and scientific environments, was equally suitable for commercial applications, and that it could be easily installed and used.

Events well justified his judgment. Following the successful installation of ETOS, Jackson wrote an online order processing system which also covers some aspects of production control and is integrated with customer invoicing.

Orders from the clothing manufacturers which use Greenberg's sewing and embroidery threads come in daily by telephone or mail and are passed to the production co-ordinator who keys the details into a video terminal. During the day, the progress of shop floor work is also recorded on this terminal. Details are contained in work tickets which are passed back to the production office each time a manufacturing process has been completed on a batch.

At the end of each day, the computer prepares on the matrix printer in the production office a list of active orders, giving the status of each. This detail is also retained on disc so that the file can be interrogated when customers enquire about the progress of their orders (the manufacturing processes take minimum 10 days to complete).

In the costing office, the computer daily prints a stock statement showing the quantities of raw material on order, in store and in use on the shop floor, and the stocks of finished goods awaiting despatch.

First thing every morning, the computer prints out in the production office a "dye cheese sheet," which derives its curious name from the cheese-shaped cores on which thread is wound ready for dyeing. This document is of great value to Greenbergs, for it aggregates all batches that use the same dye formula.

In pre-computer days, it was not feasible to do this, so dyeing facilities were sometimes underused and materials wasted, or the same dye might be prepared twice in one day. Greenberg estimates that savings in this area have been 10 to 15%. Despatch arrangements are varied according to each customer's requirements. If, for example, one item is wanted urgently, this will be sent as soon as possible without waiting until others are available. Sometimes most of the consignment may be held in store to await call-off by instalments over an agreed period.

Which action shall be taken is determined in the production office after calling out the customer order detail on the terminal. Whatever the decision, the co-ordinator instructs the system to print an invoice/delivery note set on her terminal.

One copy of this document accompanies the goods; the other goes to the accounts department which posts the item to the customer's manual ledger account. When the computerised sales ledger system has been completed, the ledger account will be posted automatically.

Greenberg's experience provides an example of how intelligence and enterprise has led an initially naive computer user to design and install systems that are probably at least as effective as could have been obtained from other sources and are uniquely suited to the company's requirements.

They have also been enthusiastically accepted by the end-users. When the sewing machine test rig which originally triggered acquisition of a computer is eventually put online, the company plans to market the system, as a package, to other users.

As a postscript, it is pleasant to record that Greenberg and Jackson are so impressed with the performance of ETOS that they recently arranged a seminar to pass on their experience to other potential users.

Appointments

LONDON	Derek Blakemore	01-261 8454
MANCHESTER	Owen Kelly	061-872 4211
BIRMINGHAM	Alan Escott	021-356 4838
GLASGOW	Owen Kelly	061-872 4211
BRISTOL	Alan Escott	021-356 4838
LONDON	Steven Gosslingthwaite	01-261 8174
MICHAEL WHITE	Classified Advertisement Manager	01-261 8028/8658

F International looks back on its first 15 years

By Steve Shirley

BEING forever told "you really should write a book about the company" perhaps if I ever make a permanent retirement, I will do so.

Certainly I had little idea of what I was starting in August 1962 when I made a nominal retirement from conventional work with the then ICT and started this software house with all of £6 working capital.

Looking to 1962, it now seems way back in the development of computing. There was no division between systems and programming work and a sound maths degree was almost a prerequisite.

Being a lapsed mathematician our early work was very slanted towards scientific computing — vestigial remains can be seen in our impressive academic scientific group — though nowadays our bias is towards the commercial.

Projects range from assignments with one programmer perhaps working with terminal in her study to multi-disciplinary teams of business analysts, sysystems analysts and designers plus programmers peaking at 50 plus.

The nature of our work has always followed market demands and today ranges from straightforward accounting type applications to assignments at the "sharp end", for example, we are just into the maintenance phase of our first major application using microprocessors, a real time application which has technically stretched us.

Of all the many changes over the years, the single absolute constant has been the employment policy "to utilise, wherever practicable, the services of people with dependents or otherwise unable to work in a conventional way".

This includes the ladies of F International looking after aged parents, the disabled, as well as the women with young children who form the bulk of our 350-strong technical workforce, mainly in the UK, but with seven now in the Scandinavian subsidiary, and recently we have taken on three in the Benelux countries at our small base in The Hague.

Today we carry out 100 times more work in a month than we did in the entire first year of our trading. To get to this happy position, the organisation has had to be under continual review and modification in order to remain in a structured, manageable form.

We concentrate on keeping the management links as short as we can though, sadly, there is no system so efficient and economic as the fully integrated management information system embodied in a "one-man business".

It was satisfying and quite exciting to know everybody in the firm and every single thing going on. Nowadays, communications is our biggest overhead.

It is often thought that our low fixed costs (small offices out of London, with few salaried staff) would allow us to offer very cheap prices; in fact our overheads are just as high as in any other quality service company.

They are merely spent on very different things: postage, telephones, telex, photocopying, travel costs, couriers, and, above all, the heavy supervision and management costs necessary to keep the company growing.

We have come a long way since the days when I would feed the shillings into the photocopying machine on Marylebone Station. Today, we churn out 2,500 copies a day and are Rank Xerox's heaviest user of its Model 4500 copier/collator which lords it in our still tiny offices.

Despite the many changes, other factors have remained reasonably constant. We have always combined the commercial aim of providing excellent value for money — for example, on any sizeable fixed price programming assignment, we reckon to come out at two-thirds anyone else's quotation — with a happy and friendly working environment where people enjoy the hectic pace of activities. For much of F International's success is founded on straight hard work — not just by a handful of the key people, but by hundreds of technicians plus the 50 or so non-technical support staff.

So-called part-timers often find themselves working between 30 and 50 hours in a peak week. We have our share of laughs, but each working day is hectic.

Over the years we have assembled a group who more than earn their salaries and fees, who think of themselves as one of a team, and work in a team mode. And enjoy it.

Only 26 are on salary or retainer and of those most are home-based and/or part-timers. Our accounts department has three full-timers, supported by two part-timers as this is one area where we cannot decentralise the work; they laugh when I reminisce of the days where I recorded everything in a small notebook and an accountant came one afternoon a month, sat himself down at my dining-room table and sorted the lot out!

We now require monthly profit and loss statements, and the figures are taken up to trial balance.

Being numerate systems people, we aim to employ systems techniques throughout the organisation. In 1975, for instance, we did an in-house assignment making a financial model of the company in order to work out our optimum "product mix".

Our operations research people are retained to do such modelling and simulation studies for clients. So why not use their skills in-house?

But it is a far cry from managing by the seat of the pants; nowadays the technical director, Anne Russell, can only direct activities, using of course her wide technical and commercial experience, but primarily by margin analysis — the £p.

We have also retained the policy that everybody, including the directors, be encouraged to do some fee-earning work of the appropriate level each year.

Hopefully, this avoids our top management getting too remote from the day-to-day problems or becoming old-fashioned in outlook.

After 15 years' successful trading, not only has F International won a somewhat grudging admiration from its competitors for its professionalism, but I have become closely associated with the whole concept of women's employment in our industry.

Surrounded as I am by staff of such enthusiasm, technical competence and skilled dedication, it is almost inevitable that the next 15 years will see F International go on from strength to strength.

"I had little idea of what I was starting in August 1962 when I started this software house with all of £6 working capital," says Steve Shirley, director of F International. Looking back over the last 15 years, she writes of the growth of the company and adds, that "much of F International's success is founded on straight hard work.".

DatasolveDatasolveDatasolve

Knight Contracts

Operators

With at least two years operating experience, our range of contracts could give you what you're looking for next in your career. Here are some immediate requirements:

UK

IBM DOS GRASP Ops.................London/Herts/Surrey
IBM OS VS1 Ops...............................London
IBM VM 370 Ops...............Kent – long contract, top rates
ICL SYS 4 & 2900 Ops......................UK and abroad
ICL GEORGE III Shift Leader.....................Kent

Europe

French-speaking IBM OS JCL writers. Long-term contract, starting September. Attractive salary and attractive setting – Luxembourg.

For further details or advice on these and other contracts still in the pipeline, call Sue Smyth or June Mogg now on 01-491 4706.

Programmers

London

IBM 370 OS PL1, BAL or COBOL
NCR 500 Operator/Programmer – starting October
ICL 1900 GEO II Cobol and Programmers
Univac Exec 8 Cobol Programmer
RPG II Programmers – top rates – all machines

Sussex

Data General DOS Assembler Programmers

Guildford

IBM 370 Cobol Ventek/Datashare Programmers

Geneva (also South Coast)

IBM 370 OS PL1 Programmers

For fuller details of contracts here or abroad, call Richard, Mike or Sue on 01-491 4706.

Knight Recruitment

IBM TP Specialists

up to £9500 Herts

To assist in the development of microprocessor-based communications controllers for IBM mainframes, and maybe to move into high-level customer support during the product's market launch.

You should have at least three years IBM experience (including some at Assembler level) and a knowledge of at least one telecommunications access method. IBM 3704/5 or similar experience is a big advantage, as is a knowledge of NCP or SNA. Ref. JP146 **London**

Systems Analyst/Programmer

Commercial systems
Welwyn Garden City

To rationalise an already extensive range of applications, and to prepare new developments from the feasibility stage through to implementation and continued maintenance. You will also offer analysis and programming assistance to other companies in the same sub-group of our Client's organisation.

You should be a business orientated programmer, ideally with COBOL or PL1 experience on any machine, preferably with a knowledge of both production and accounting orientated systems. Ref. JP147 **London**

Systems Analyst/Consultant

100,000 Guilders p.a.
Amsterdam

The Dutch subsidiary of an international consulting group are undergoing a period of planned expansion which will double their establishment. With projects in a wide range of applications, we would be very interested to hear from anyone with at least four years systems experience who likes the idea of a well-paid permanent job in Holland. Ref. JP21/11 **London**

Lead Programmers and Programmers

up to £4407 Leicester

To work principally in ANS COBOL and basic Assembler, with limited use of PL1 and RPG.

Lead programmers should have at least three years commercial programming experience in COBOL and be able to supervise programming teams. Professional or technical qualifications would be an advantage.

Programmers should have at least a year's commercial COBOL experience. Ref. 090 **Birmingham**

Senior Programmer, Analyst Programmer, Analyst

up to £5000 Rural Cheshire

The Company is a small but stable bureau offering a range of specialised services including financial packages and teleprocessing. The present configuration is an ICL 1904 operating under EXEC, soon changing to 2 × 2960's under VME/B.

The Senior Programmer should have two years COBOL experience and will ideally have structured programming experience, although training will be given if necessary. Analysts will already have some projects to their credit, preferably in a TP or database environment.

All these jobs offer you the opportunity to see your ideas implemented in a go-ahead company.

Ref. B123 **Birmingham**

Analyst/Programmer, COBOL Programmer

£3600-£5000 Birmingham

The main attraction of these jobs – with a bureau whose principal customer is a large freight organisation – is the opportunity to build wide-ranging programming experience in a short space of time.

The COBOL Programmer will need 2-3 years COBOL experience; the Analyst/Programmer should have a commercial background. Ref. B125 **Birmingham**

01-491 4706
24-hour answer 'phone.
Knight Computer Services
Limited, 14 Old Park Lane,
London W1Y 4NL.

Knight

021-772 8331
Midlands Recruitment,
Knight Computer Services
Limited, Woodlands Road,
Birmingham B8 3BD.

Knight Computer Services Limited

The Staff Services Division of BOC Datasolve Group and a member of CSA Computing Services Association

For a better tomorrow, act today. To speed up your application or to get information on opportunities in the future, send us the coupon.

Name..
Address..
....
....
Tel: (home)..
Tel: (work)..............................Ext.............
Area pref..
Number of years experience in..............................
Operating ☐ Programming ☐
Analysis ☐ M/C & Lang ☐
Salary required..
Position required: Permanent ☐ Contract ☐

JBA

Sales Division Project Manager and Senior Consultant

Herts. **to £9000 + car**

A highly successful computer manufacturer is seeking to appoint two senior members for a team which is totally responsible for the Company's large systems sales. Candidates will be able to demonstrate previous experience of project control, probably in a post sales support role; have the ability to identify customer requirements; co-ordinate resources, and deal positively with clients. Proposal writing and presentations are both considered important aspects, together with an understanding of Distributed Processing and DBMS applications, while experience on large mainframe machines would be a distinct advantage.

Excellent salaries according to experience.

Contact: Margaret Stevens

Software Specialists

Home Counties **up to £6500.**

Our client, a leading software house with impressive growth plans, has vacancies for programmers and designers to develop new products and software.

Candidates must have at least two years' in the design and implementation of compilers, emulators, operating systems or communications software. These are new and challenging opportunities for staff with potential.

Salaries are negotiable. Large company benefits.

Contact: Jim Baker

Systems Analysts

Cambridgeshire **up to £5500**

Our client, part of an international manufacturing group, are seeking analysts for additional development work and to expand existing teams. Applicants should have about 2 years' experience in an IBM environment and the ability to progress into project leadership.

Generous company benefits and relocation assistance

Contact: Margaret Stevens

Programmer

South London **to £5500**

This rapidly expanding company providing services to the Oil Industry requires an additional programmer to join their development team. Applicants will have at least three years' programming experience one of which should be in BASIC, or other high-level languages, on IBM equipment.

The company offers challenging and varied work coupled with security and excellent career prospects.

Contact: Margaret Stevens

Technical Programmers

West Country **up to £5000**

A large industrial/manufacturing organisation is continuing to expand its development of technical and process control systems and therefore has opportunities for programmers with engineering backgrounds.

Applicants should have about two years' experience of minicomputers in industrial control, military or message switching applications using FORTRAN, CORAL, RTL/2 or other similar languages.

This is a genuine chance to progress with a well-established leader in the field.

Competitive salaries and generous relocation allowances.

Contact: Jim Baker

Computer Engineer/Programmers

Most areas **Negotiable**

We would like to hear from computer engineers with experience in one of the following: commercial systems support; on-site customer engineering; technical systems design/development, or ATE. Also, software programmers with a bias towards hardware who can assist engineers in a support role.

Our clients are able to offer interesting varied work and, in some cases, provide a company car.

Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

Institute of Oceanographic Sciences

Scientific Systems Programmer

The Institute is installing a Honeywell 66/20 at its Bidston Laboratory as a centre for its shore-based computer operations. The system will have extensive on-line storage and a network will provide access from remote sites to time-sharing, RJE and data base facilities

The Institute is anxious to develop the system as a powerful scientific tool and is looking for a SYSTEMS PROGRAMMER to work on the Honeywell 66 and to become familiar with the GCOS operating system. Experience in a low level language, preferably on a large system, is essential.

The work will be varied and is an excellent opportunity to join a scientific community working in the environmental sciences. The appointment will be made according to age, qualifications and experience in the grade of Scientific Officer or Higher Scientific Officer. Candidates should have a degree, HNC or equivalent.

Salaries and Conditions

Scientific Officer (SO) £2149-£3527 p.a.
Higher Scientific Officer (HSO) £3254-£4454 p.a.
+ Phase I supplement of £313.20 p.a. and 5% Phase II supplement subject to maximum of £208.80 p.a.

The starting pay may be above the minimum. There is a non-contributory superannuation scheme and a generous leave allowance.

Please write (or telephone 051-653 6633 ext. 29), quoting reference IOS 77/201, for further details and an application form. The closing date for completed applications is 21 Sept., 1977.

INSTITUTE OF OCEANOGRAPHIC SCIENCES
Bidston Observatory
Birkenhead, Merseyside

Natural Environment Research Council

Junior Computer Operator

The successful applicant must have at least six months' experience with ICL 1900 and will be required to work shifts (7.30 a.m. to 3.15 p.m.) and (2.45 p.m. to 10.30 p.m.) alternate weeks. 25% shift allowance will apply. Salary negotiable according to age and experience.

All applications in writing to:—

Mrs. Ellen B. Challis, Personnel Manager
Brown, Jenkinson & Co. Ltd.
Maritime House, 1 Linton Road
Barking, Essex 1G11 8HH
Tel: 01-591 4222

CALLING ALL KIENZLE TRAINED

PROGRAMMERS

(and also other very experienced VRC programmers and analyst programmers who can convert with minimum effort)

KIENZLE have a number of posts at Slough for highly productive and well-motivated people to specify and write new applications for established users, working within a specialist group dealing only with software services for users.

For the right people, KIENZLE offers a remuneration package of salary and generous incentive bonus which can lead to exceptionally high earnings. KIENZLE also gives 4 weeks' holiday, flextime, pension, subsidised canteen, modern offices, etc.

WE WANT THE BEST! IF YOU ARE GOOD ENOUGH.

Contact

Mrs. B. Haythorne
User Software Department
Kienzle Data Systems Ltd.
224 Bath Road, Slough
SLOUGH 33355

KIENZLE Computers

Computer Programmers

We are looking for experienced Programmers to join an enthusiastic team who are currently involved in writing large complex data base systems.

Applicants should have reached an educational standard of not less than GCE 'A' level in two subjects, one of which should be mathematics. Preference will be given to men or women who have a working knowledge of IMS DB/DC DL/1 and COBOL language. Present hardware configuration comprises IBM 370/135, and 158.

For further details of the salary range and benefits, please write to or telephone

Norma Smith, Personnel Officer, Rolls Royce Limited, (Aero Division),
P.O. Box 17, Parkside, Coventry CV1 2LZ. Tel: Coventry 27666
Ext. 336.

ROLLS ROYCE LIMITED
Aero Division

ASSEMBLER PROGRAMMER

£4000 - £5500

plus valuable fringe benefits

Lloyds Bank International has a vacancy for an experienced assembler programmer in its Computer Services Department in the City.

The Department provides data processing for LBI's operations in London. Systems currently installed include a real-time dealing system supported by an integrated database.

During the next three years LBI will be transferring from Burroughs to IBM 370/168 (MVS). An experienced programmer is required to work within a team providing software and technical support to applications programmers.

The successful applicant will have at least three years programming experience, two of which will be in either IBM or Burroughs (3500) assembler.

The starting salary will be between £4000 and £5500 depending on experience. Fringe benefits include: excellent non-contributory pension scheme; free lunches; advantageous loan/mortgage facilities; 22 days holiday a year. The position also offers very good career prospects.

Please write, giving full details of qualifications and experience to Rosemary Prebble:

LLOYDS BANK INTERNATIONAL
40-66 Queen Victoria Street, London EC4P 4EL.

Cheshire — Manchester — Lancashire

Manchester	Contract Cobol/RPG Programmers	c £7K
Manchester	Contract 1900 Operators	c £4.5K
Preston area	Systems Analyst Industrial background	to £5K
S. Manchester	IBM/ICL Cobol Progs. Min 2 yrs exp	to £4.5K
N. Manchester	IBM/ICL Cobol Progs. Min 2 yrs exp	to £4.5K
Stockport	Snr Cobol Prog. Min 3 yrs exp	c £4.4K
Liverpool	Cobol Progs. Min 18 mths exp	to £4.2K
Preston area	Progs IBM Cobol. Min 18 mths exp	to £4K
Stockport	Cobol Progs. Min 18 mths exp	to £3.8K

Full information on these and many other vacancies available in complete confidence by telephoning:

061-980 6879 evenings & Weekends or 061-486 0591 day; alternatively write to Leo Richfield Ltd (Recruitment Consultants), Bridge Buildings, Ladybridge Rd, Cheadle-Hulme, Cheshire. Discussions after work can be arranged.

OPERATORS!

THAT RARE CHANCE TO MOVE OUT OF OPERATIONS & INTO SYSTEMS & PROGRAMMING!

EAST MIDLANDS **SALARIES: £3,500 to £4,250 p.a. + superb benefits package**

This is a unique opportunity to move from an Operator role — not just into application programming — but into a ***JUNIOR SYSTEMS ENGINEER'S*** role in support of a new major software product. You should have:

- ★ a sound educational background
- ★ a good understanding of 1900 or 370 hardware and operating system software from an operations standpoint
- ★ thorough knowledge of JCL
- ★ the ability to develop assembler programming skills
- ★ a preparedness to travel, and the capability of working with customers
- ★ aged 22/28
- ★ perhaps a knowledge of payroll systems, particularly UNIPAY

Generous re-location expenses are available.

CONTACT: REG HEATH on:
021-236 3781 **REF: 77/08/20**

COASTAL LOCATION

SYSTEMS PROGRAMMER

ATTRACTIVE SALARY BASED ON PREVIOUS EXPERIENCE

We are retained to recruit a Systems Programmer for our Client, a wholly owned subsidiary of one of the World's largest Food Groups. They are currently utilising dual IBM 370 machines with teleprocessing to approximately 50 sites throughout the UK, and this equipment will be substantially up-graded later this year.

They require a Systems Programmer with a minimum of one year's experience in this role, who ideally should have experience of DOS/VS and CICS. However, our Clients are prepared to train a candidate who has some involvement in systems programming, but may not hold all the necessary qualifications.

Our Clients are located in pleasant offices, close to coastal amenities in South Humberside, and offer all of the benefits one associates with an International Group of Companies, including a very generous re-location package.

CONTACT: TONY DEANE on:
061-833 0676 **REF: 77/08/21**

Initial interviews will be held in Manchester, Birmingham and London.

SCR

COVENTRY NETWORK CONTROL SUPERVISOR

SALARY TO £5,700 P. A.

Our client is strengthening its Group Plans Function which has recently been formed to establish detailed planning and control networks for all the major programmes of the business plan and to provide an information service at group and functional level.

The Network Control Supervisor will be responsible for the day to day running of a Hewlett Packard 21MX mini computer and for the development and maintenance of networks on this machine.

Interested applicants should have:—

- ★ experience in using or operating mini computer based systems, and some familiarity with the operational requirements of such systems
- ★ some familiarity with project planning and networking techniques
- ★ a general appreciation of the responsibilities in developing a business plan and controlling timed activities for the implementing of particular programmes and projects.

Excellent benefits include pension and a lease car scheme.

If you are interested in a challenging position within an exciting new project.

CONTACT REG HEATH ON: 021-236 3781 REF NO 77/08/22

WEST LONDON SALES (Time Sharing)

INCOMES TO £10,000 P.A.+CAR WITH NO CEILING ON EARNINGS

Timesharing sales is currently one of the most bouyant sectors of the services industry. Our client is probably the most exciting company in this field, with a growth record and plans supported by superb products and adequate resources to further develop its market penetration.

The sales force is composed of high earning professionals. The specific position demands:

- ★ solid performance in timesharing sales, mini computers or VRC selling
- ★ sound commercial systems understanding
- ★ aged 25-35.

to handle:

- ★ a prime West London based territory to include North Surrey, SW1, Middlesex and Hampshire.

Interested? Pick up the phone and talk to:

PETER RIGBY ON: 021-236 3781 **REF NO 77/08/23**

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021·236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061·833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 3BD

LONDON 01·935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

ANALYST/ PROGRAMMER

WOKING, SURREY **UP TO £4,000**

A large manufacturing company offer an excellent opportunity to join an EXPANDING Computer Department currently using an ICL 2903 Computer in a mixed commercial/production environment.

Experience of COBOL, RPG and ON-LINE applications would be advantageous

ASSISTANT OPERATIONS CONTROLLER

UP TO £3,000

The applicant should have a sound OP background.

Knowledge of ICL Utilities would be advantageous, although training could be given.

Contact:
The Personnel Officer
JAMES WALKER & CO. LTD.
Lion Works, Woking, Surrey
WOKING 5951

TREASURY DEPARTMENT

Programmer £2,529 - £3,702 + Supplements

Applicants should have a minimum of one year's programming experience in COBOL and preferably have a working knowledge of PLAN.

The successful candidate will work on a variety of projects and will be encouraged to widen their experience by assuming some responsibility for systems work. Suitable training will also be given to obtain the NCC certificate in systems analysis. Starting salary will be according to experience.

The installation is an ICL 1902T with 48K store and EDS facilities with a communication system.

Applications should be forwarded to the Treasurer, Century House, Hardshaw Street, St. Helen's, Merseyside, by 5th September, 1977.

St Helens
METROPOLITAN BOROUGH

CREDIT LYONNAIS

a leading French Bank, long established in London, has recently installed a 256K IBM 370/125/2 which is currently being used on batch systems and to which the Bank's 16 existing terminals will shortly be connected for on-line applications.

Two additional staff are required to work on a 2-shift, 5-day week system. Salaries are inclusive of shift allowances and there are attractive fringe benefits, including LV's and an annual bonus.

2 COMPUTER OPERATORS

with at least 1 year's experience including 370 operation under DOS and, preferably, VS. A starting salary of around £3250 per annum is envisaged.

Applicants should have a mature and responsible attitude to their jobs and be able to work well in a small team.

Please apply in writing to:

Mr. H. Young, Personnel Manager
Crédit Lyonnais, P.O. Box 81
84-94 Queen Victoria Street, London EC4P 4LX

CITY up to £6,500

COBOL PROGRAMMERS/ANALYSTS

Computer Express is an established consultancy, providing professional service to a variety of clients. We are looking for programmers and analysts with at least two years' experience. We offer a challenging environment with good future prospects.

Telephone or write to The Technical Director, Computer Express (Services) Ltd., 69 Carter Lane, London, EC4. Tel. 248 5219.

THE UNIVERSITY OF MANCHESTER

LECTURER IN COMPUTER SCIENCE

Applications invited for the above post from applicants who should have a good general background in Computer Science, particularly in the areas of Compiling Techniques, Operating System Techniques and System Implementation Languages. Candidates with an interest in Hardware Architecture and first hand experience of Compilers/Operating Systems will be strongly preferred. Initial salary within range £3,333-£3,975 p.a. Superannuation. Further particulars and application forms (returnable by September 19th) from the Registrar, The University, Manchester M13 9PL. Quote ref: 141/77/CW.

SENIOR OPERATOR **£3.9K**

Our client, a large retail organisation who have offices in the West End require an operator who will assume the role of Shift Leader when the company convert to a 3 shift system. They operate under DOS POWER Ref. 133

DAYS OPERATOR **£3.5K**

Min. 18 mths operating experience of 360/370 needed for this small 360 concern on the Essex/London borders. Ref. 178

OPERATOR SYS 3 **Circa £4K**

This SYS 3/15 banking concern based in the City needs an operator with about 6 mths. experience to work a fixed evening shift (1200-2100 hrs.) 30p LV plus all banking fringe benefits. Ref. 147.

DOS OPERATOR **£3.6K**

A City position offering banking benefits require operators with 18 mths. DOS experience to work a 370/135. Ref. 181.

OS OPERATOR **£4K**

360/65 in Herts needs a good OS person with a minimum of 2 years' total operating experience. Ref. 188.

COBOL PROG **to £7K**

Our client, who runs on our own 370/135, requires a self-motivated inventive programmer who also has a knowledge of DOS operating systems. SW1. Ref. 112.

COBOL SNR PROG **to £5K**

2 yrs. Cobol or RPG for this young SYS 3/15 installation in Middx. Must have good CCP/Cobol knowledge. Ref. 175.

To discuss these or our unadvertised appointments in more detail and in the strictest confidence, call X-Calibur on 01-353 5201/3 or write to 47 Essex Street, London WC2 3JF

X·Calibur
COMPUTER SERVICES

LONDON BOROUGH OF BARKING

BOROUGH TREASURER'S DEPARTMENT

COMPUTER PROGRAMMER

Salary range £3126-£3450 per annum inclusive plus earnings related supplement. We have a vacancy for a programmer with at least 1 year's experience to join a small computer section engaged in writing and maintaining programs written in RPG11 for an IBM 370/125 operating under DOS/VS.

Application forms and further details are obtainable from the Borough Treasurer, Civic Centre, Dagenham, Essex. Telephone 01-592 4500 ext. 231.

Systems Engineering

Kins Applied Technology Limited are a systems house specialising in turnkey computer systems in the fields of process control, business automation and data communications. Within the well-established WS Atkins Group, we are a young company committed to long-term development.

We are seeking individuals to join the company and grow with it. We wish to recruit specialists in control systems and data communications. These vacancies are based in Epsom and are open to men and women.

Applications Engineers (Ref. SE/OH1) to provide the high-level technical support required by our Marketing/Sales department to formulate technical proposals and help negotiate these with customers and provide the vital link between sales and engineering.

Systems Engineers (Ref. SE/OH2) with several years' experience in the design of computer-based control or communication systems, responsible for design and development of systems from initial specification right through to installation and commissioning.

Systems Programmers (Ref. SE/OH3) with experience in the use of assembler and high-level languages such as PAL, CORAL and RTL2, and to be responsible for design and preparation of complex programs in a real-time environment.

Electronic Technicians (Ref. SE/OH4) with several years' experience of building and testing digital logic units. The work will be varied and interesting with additional opportunities for involvement in small mechanism design and software development.

Good salaries are offered with superannuation and disability insurance benefits. Removal expenses will be paid where appropriate.

Please write sending details of qualifications and experience to Mrs P E Finch, Senior Personnel Officer, Kins Applied Technology Limited, Woodcote Grove, Ashley Road, Epsom, Surrey KT18 5SW or telephone Epsom 28140 extension 2858 for an application form.

Kins Applied Technology

DEPARTMENT OF COMPUTING SERVICES

Program Adviser

Candidates should preferably have at least 4 years' computing experience, or possess a degree or a teaching qualification. The post will be to assist both students and staff in locating programming errors. Programming languages employed will be almost exclusively BASIC.

Salary: £2529 to £2853 plus supplements of £312 and £130 p.a. approximately.

Further details and form of application from The Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham NG1 4BU. Closing date 5th September, 1977.

TRENT POLYTECHNIC NOTTINGHAM

Lancashire Education Committee
BLACKBURN COLLEGE OF TECHNOLOGY & DESIGN
Feilden Street, Blackburn
BB2 1LH

NON-TEACHING APPOINTMENT IN COMPUTING CENTRE

The Centre has an ICL/1903 offering batch and terminal services on a two-shift system both internally and to other Schools and Colleges.

COMPUTER OPERATOR T1

(Trainees will be considered)

Salary £1218-£2529 plus 12½% shift allowance plus £492 supplement

COMPUTER PROGRAMMER AP2

Salary £2529-£2883 plus £492 supplement

Duties include software documentation, technical advisory service, writing programmes for academic staff. Relevant experience essential.

Applications by letter as soon as possible to the Chief Administrative Officer, stating age, qualifications and experience.

Thames Polytechnic

Computer Centre

Programmers

Applications are invited for two posts of programmer in the Computer Centre. Candidates should have a suitable degree or equivalent qualification and be experienced in at least one high level language. Previous experience in a similar environment is preferred.

Salary scale: £2786 - £4258 inclusive.

Further particulars and form of application may be obtained from the Staffing Officer, Thames Polytechnic, Wellington Street, London SE18 6PF to whom completed applications should be returned by 7 September, 1977.

Holland Automation International

SOFTWARE DEVELOPMENT STAFF

FOR IRELAND

cc £8000

Holland Automation is an International Company operating in Holland, Germany, and the U.K., and we have a reputation for producing high quality software. In the development area we have written specialised operating systems, communication emulators for all micro-processor companies and major European computer manufacturers.

We are looking to Ireland to increase our development capacity by building a highly qualified and motivated team working on software development in its broadest sense in the areas of

- *micro-processor based products*
- *small / medium size business computer systems*
- *hardware prototypes utilising various micro-processors*

The Company requires a minimum of 4/5 years' programming experience in either

- *assembler programming or operating systems development on small business computers*
- *data transmission and communications*
- *micro computer software or hardware development*

The Company offers

- *option of full shareholding to participate in Company profitability*
- *good salaries based upon experience up to £6,500 with additional performance bonus*
- *car or car allowance for experienced staff*
- *additional fringe benefits including pension benefits*
- *flexible office hours — South Dublin location*
- *on-site equipment for testing*
- *re-location assistance where appropriate*

Applicants should write or ring

From U.K.:
Mrs. B. Aiken
Holland Automation International
(U.K.) Limited
457a & 459 Bath Road
Cippenham
SLOUGH SL1 6AA, Berks.
Tel. Burnham (06286) 65232

From Eire:
Mr. S. E. McGlynn
National Manpower Service
O'Connell Bridge House
DUBLIN 2
Tel. Dublin 782866

ANGLIAN COMPUTER SERVICES

SPECIAL ANNOUNCEMENT

With immediate effect Anglian Computer Services becomes:

ANGLIAN D.P. SERVICES LTD.

Due to expansion, we have found it necessary to change our company name and relocate to larger offices.

We have many vacancies for computer staff on our books. We are particularly looking for people with RPG II and COBOL experience to work in Norfolk or Suffolk.

For further details ring Steve Tumbridge on Danbury 4255 (STD 024 541).

Our new address and telephone number is:

ANGLIAN D.P. SERVICES LTD.
Stratford House, Maldon Road
Danbury, Chelmsford CM3 4QW
Tel: Danbury 4255 (STD 024 541)

Glynwed Foundries

Systems Analyst

The Foundries Division of the progressive Glynwed Group requires a mature analyst at its headquarters in Telford. Reporting to the local management, he or she will develop computer systems in conjunction with the central Group data processing team, using IBM hardware and telecommunication facilities.

The post calls for sound practical experience of commercial systems development and installation. It would be an advantage if candidates aged 25-40 with appropriate formal training had experience of foundry operations.

Salary is negotiable and will depend upon age and experience. Terms of employment are those normally associated with a successful public group.

Please send full personal and career details to:-

K. Holding, Group Staff Manager,
Glynwed Group Services Limited,
Headland House, New Coventry Road,
Sheldon, Birmingham B26 3AZ.

GLYNWED

We are an international oil service company and are currently seeking a:-

COMPUTER OPERATOR

to operate the following equipment: PDP 11/10 and PDP 11/45 (RSX-11 D with Disks).

Applicants must have at least one years experience on one of the above machines and must be prepared to work shifts which include nights and weekends.

We offer a sterling salary of up to £4,300 plus L.V.'s, with 4 weeks' holiday and other fringe benefits associated with a major company.

Please telephone Christina Bray on 01-240 2167 ext. 227 for an application form.
Schlumberger, 1 Kingsway,
London, WC2.

Schlumberger

CENTRONICS Ireland (B.V.)

The world's leading producer of matrix impact printers has established a manufacturing facility in Drogheda, Ireland. In line with the company's planned expansion in Ireland, the following staff are required for a new research and development engineering group.

Senior Mechanical Engineer

An experienced graduate in mechanical engineering with several years' experience in small mechanism design. The successful candidate will have the capability of translating design ideas into final drawings. Computer peripheral (printers) design experience desirable. Must be familiar with state of the art in manufacturing technologies. Sheet metal, sintered parts, turned parts and injection moulding. Must be versatile in design with prime movers and be familiar with magnetics.

Communications Engineer

An experienced electronics engineer with three to five years' experience in data communications relating to systems interconnect and data processing communication via transmission line.

Applicants should be fully experienced in transistor theory, TTL/CMOS and other special reactive components typically used in communication systems.

The successful applicant will have designed and implemented into production interfaces for data communication.

This position requires direct customer contact and will necessitate some travel in Europe. Knowledge of French and German desirable.

Salaries will reflect the level of responsibility and experience of the successful applicants. In addition, the range of fringe benefits normally associated with a large company will apply. Assistance with interview and relocation expenses will be paid where appropriate as permanent location in Ireland is required for both positions. Initial interviews will be held in London.

Other candidates with relevant experience for future vacancies within this research and development engineering group are also invited to contact the Company.

Candidates for the above positions should send curriculum vitae immediately to:

Mr. Michael Durkin, Ref. CW
Personnel Manager
Centronics Ireland (B.V.)
Industrial Estate, Donore Road
Drogheda, Co. Louth
Republic of Ireland
Tel. Drogheda 8981

Systems Analysts Analyst Programmers Programmers

COBOL PL/1

New Zealand offers career advancement and a better way of life

Among our clients are some of New Zealand's leading industrial companies, computer bureaus, software and hardware companies.

They currently have requirements for experienced Systems Analysts capable of working in the systems development area. Experience in on line systems, data base management or project control is desirable. Preferred age range is 25 to 35 and salaries in the range of NZ$10,000 to $15,000 are offered.

As one of our Senior Consultants will be conducting interviews in the UK in the near future interested applicants should send by airmail brief details of qualifications, experience and personal background to:

ASSOCIATED PERSONNEL CONSULTANTS LIMITED
P.O. Box 3439, Auckland, New Zealand

ARA

Astral Recruitment Associates

Mini-Computer Engineers Saudi Arabia

3 weeks' leave after every 6 weeks
Free housing. Free food
£6,300-£11,500 (after tax)

The Arabian American Oil Company (ARAMCO) is seeking qualified Engineers experienced in the maintenance of mini-computer systems used in process control, energy management and other sensor-based applications. The need is for:

Digital Systems Engineers

who have a Degree/HND or HNC in Engineering and extensive experience in up to date theory covering logic circuits, core and semi-conductor memories, bulk storage devices and CRT consoles. They should also be experienced in assembly language, machine language programming, and both diagnostic fault-finding techniques and hands-on system trouble shooting. A minimum of 5 years' post graduate experience is required.

Ref. 8253/CW/A

Computer Technicians

with experience of real-time mini-computer maintenance and peripheral maintenance. Peripherals include typers, line printers, disk drives, drums, colour CRT consoles, and process interface units. Duties will cover troubleshooting at the system level, routine maintenance and calibration on electro-mechanical peripherals, RTU's and process interface units. 10 years' experience is looked for.

Ref. 8253/CW/B

R.T.U. Technicians

who will carry out front panel trouble shooting on Remote Terminal Units, perform tests to verify the effect of board/card replacement, carry out analyses to locate problems in the R.T.U. or communications.

Ref. 8253/CW/C

Systems Analyst/Engineers

who are probably Physics or Maths graduates turned Programmer, but also have hardware experience and understand operating systems and the fundamentals of computer science. They will be concerned with the development of mini-computer process control systems and involved in the writing and implementation of the detailed system specification. After installation they assist the vendor in de-bugging the system and provide continuing software maintenance. They could also be involved in applications programming in subsequent phases of the project.

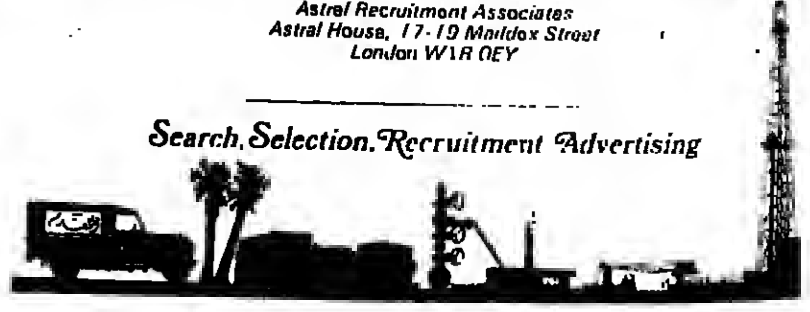
Ref. 8253/CW/D

Appointments are single-status based on 1 year renewable agreements. The special work schedule provides for 3 weeks paid UK leave every six weeks, housing, food and top class medical facilities are free and recreational facilities are excellent. A valid UK driving licence is essential for all appointments.

Please send a brief career history as soon as possible, quoting the appropriate reference, to

Richard Darvall
Astral Recruitment Associates
Astral House, 17-19 Maddox Street
London W1R 0EY

Search, Selection, Recruitment Advertising



Software Librarian
EMI Scanner computer programs.

An opportunity exists at EMI Medical, in Hayes, to take charge of a software library serving a group responsible for planning and developing computer programs of EMI Scanner systems.

Library facilities are to be expanded and the librarian will be expected to build them into an efficient system for storage and ready retrieval of programs and information. Functions include the administration of security filing, lending service, receiving and issuing software programs and the day to day running of the library.

So administrative ability is essential – but mere efficiency will not be enough. The aim is to ensure that every member of the software department *wants* to make full use of library services as a matter of course.

And that will take above-average tact and diplomacy – backed by sound commercial experience. Plus, if possible, software library experience or two years associated with computers. Educational level: degree, perhaps – A-levels, certainly. Minimum age: about 24.

Salary is widely negotiable. You are probably earning a good salary now, but your experience and ability – above all, your personality – could be worth much more. And EMI employee benefits are, of course, first class.

It's a rare job for a rare person, male or female. If you think you're up to it, please telephone or write immediately – to Neil F. Robotham, Personnel Department, EMI Limited, Blyth Road, Hayes, Middlesex. Telephone 01-573 3888. Or Record-a-Call anytime on 01-573 5524.

EMI **EMI Medical Limited**

A member of the EMI Group of companies – international leaders in music, electronics and leisure

---

Why are CMG always advertising for staff?

The computer services market in the UK and the rest of Western Europe is growing at between 25% and 40% a year.

This is what is actually sold and not what *could* be sold if more resources were available.

The growth of CMG since its formation in 1964 has been substantial – Turnover during 1975/1976 was £5.4 millions.

To sustain our rate of expansion which is in line with market growth we will require at least thirty more people in our UK branches during 1977.

What's so special about CMG?

We are a young company committed to:-

- Building a successful company, wholly owned by those working in it, where each person could "be his/her own boss," to the maximum possible extent.
- Paying high salaries, providing top conditions, and pension arrangements in order to attract the best people in the industry, in return for hard work and maximum opportunity.
- Organising the company in small manageable groups and units, where everyone can know everyone else, with maximum delegation of responsibility.
- To making all management appointments from within.
- Making all information about the company available to everyone, with no exceptions.
- Involving every member of the company in the decision making process through regular staff, management and policy forming meetings.
- Sharing profits, and enabling all staff to buy shares in the company.

What vacancies are currently available?

Systems and Programming Consultants

at CMG Middlesex at CMG West End
at CMG City and at CMG Southern

£4000 to £6000 £6000 to £8000
£8000 to £10,000

Operators

at CMG (UK) Ltd.,

£3000 to £5000

What exactly is a Systems and Programming Consultant?

Depending upon the requirements of the project to which they are assigned, our staff may be called upon to use any or all of their programming, systems, management and general consultancy skills. We do not separate programming from systems work as far as job functions are concerned.

Whilst at times people will use their experience of specific machines, languages, and applications they will also be required to draw upon their general computing experience and learn new specific skills with the assistance of other experienced CMG personnel. We therefore require people whose prime interest is in developing systems and solving business problems rather than working with specific equipment.

The main job satisfaction is gained from getting work ready within agreed cost and time scales. There is a considerable amount of customer involvement and everyone is expected to participate in the sales effort of the company. People are given all the responsibility that they can handle and there are unrivalled opportunities for promotion, all of which is from within CMG.

We require a minimum of two years programming experience. Experience on any commercial machines is considered relevant with experience of both mainframes and mini's being preferred. Similarly the particular languages used are not important but we prefer a knowledge of both high-level and low-level languages, with COBOL and any Assembler language being the most desirable.

Experience of project leading, customer involvement, management responsibility and sales involvement are not essential for all vacancies but some or all of this type of experience would be required for the more senior positions.

We require experience with commercial and financial applications with general accounting knowledge being the most useful.

What experience is necessary for a CMG Operator?

At least three years' practical experience is essential with a knowledge of more than one type of computer being most useful.

Preferably, you will have some experience of the responsibilities of working at a senior level.

The ability to work with the minimum of supervision is a basic requirement of our Operations Staff.

The work will involve responsibility for optimising throughput and quality of the work produced on our Burroughs and Honeywell machines.

Where do I apply?

Please write or telephone for an application form quoting ref: CW/28 to:

Ann Baird,
CMG (City of London) Limited,
Eastgate, 73 Leman Street, London, E1 8EY
Tel: 01-481 3881

OR
Jane Leiper,
CMG Computer Management Group
(Middlesex) Limited,
Westway House, 320 Ruislip Road East,
Greenford, Middlesex UB6 9BW.
Tel: 01-578 4563

OR
Janet Gothard,
CMG (West End) Limited,
Sunley House, Bedford Park,
Croydon, CR0 2AP
Tel: 01-686 8251
(To be relocated in London)

OR
Bobby Rogers,
CMG Computer Management Group
(UK) Limited,
Sunley House, Bedford Park,
Croydon, CR0 2AP.
Tel: 01-681 7631

OR
Barbara Clark,
CMG Computer Management Group
(Southern) Limited, Sunley House,
Bedford Park, Croydon, CR0 2AP.
Tel: 01-686 8251.

CMG

London · Amsterdam · Frankfurt
Rotterdam · Brussels · Glasgow

H. PROGRAMMING & SYSTEMS LTD.

We are the permanent recruitment division of an established Computer Services Consultancy. We have MANY vacancies on our register which may just be RIGHT for YOU. Some of our newest requirements we set out below. Why not telephone our Joan Lovejoy at Amersham (02403) 22201 or 01-437 3063.

PROGRAMMERS, SEN. PROGRAMMERS ANAL/PROGRAMMERS £4-6k

LONDON	Mini D.G. Real time Assembler	EC1
	IBM System 3 RPG II	WC1
	IBM 370/158 PL/1	W1
	Univac Cobol	SW18
	NCR Century 100 Cobol	N
AVON	IBM 370/125 Assembler or Cobol SOFTWARE PROGRAMMER and SENIOR PROGRAMMER	
BEDS.	ICL 2903 Cobol	
BERKS.	ICL 2903 Cobol Programmer/Operator	
BUCKS.	IBM System 3 RPG II ICL 1901T Cobol/Plan	
ESSEX	IBM 370/145 Ass/PL/1 Burroughs B 500 Assembler	
HERTS.	IBM 370 Cobol or P.L./1	
HUNTS.	IBM 370 Cobol or Ass	
KENT	ICL 1900 Cobol Honeywell Cobol SYSTEMS PROGRAMMER 370	
LANCS.	IBM/Cobol ICL 1901A Cobol	
MIDDX.	Honeywell 6080 Cobol ICL/Cobol 1900 IBM 370 Cobol	

SOMERSET	ICL 1900 Cobol
STAFFS.	IBM 370 PL/1
SUFFOLK	Honeywell 200 Cobol
SURREY	Honeywell 318 Cobol IBM 370 Assembler IBM 370 Cobol BAL ICL 1900 Cobol
SUSSEX	IBM 370/145 PL/1 or Cobol IBM 370/138 Ass SOFTWARE PROGRAMMER
WILTS.	IBM 370/145 Cobol ICL 1900 Cobol

OPERATORS £2.5-£3.5k

BUCKS.	IBM Sys. 3 DSM
BERKS.	ICL 2903 RPG II
SURREY	IBM 370 DOS/VS
LONDON S.W.7	DATA CONTROL Clerk
BUCKS.	SYSTEMS ANALYST AND PROJECT LEADERS on IBM System 3 RPG II £5,200.
HERTS. AND HUNTS.	SYSTEMS ANALYSTS for IBM 370 Cobol Installation. £4.7k to £5.5.
HANTS.	PROJECTS MANAGER for IBM 370 Cobol Installation. £6k.

CONTRACT & FREELANCE

IF YOU ARE COMMITTED FOR ANY PERIOD OF TIME AHEAD, RING US WITH YOUR AVAILABILITY DATE AND WE WILL ENSURE THAT YOU ARE CONTACTED IN ADVANCE OF THE END OF YOUR PROJECT TO MAINTAIN WORK CONTINUITY. PROJECTS IN U.K. AND HOLLAND. TELEPHONE PETER QUIN or JAMES BARKER on AMERSHAM (02403) 22201 or 01-437 3083.

H.P.S.L. H.P.S.L. H.P.S.L. H.P.S.L.

Datasolve

Installation Management Co-ordinator

Salary to £5000

London Central Datacentre, part of BOC Datasolve, the largest independent bureau in the UK, uses an IBM 370/158 MP, operating under MVS.

Due to promotion, an Installation Management Co-ordinator is now required to be responsible for administering a formal system of problem and change control. The principal responsibilities of the job include:

- Documenting all problems encountered during computer operations.
- Producing statistics and reports using computer based techniques for senior management.
- Assisting in the planning and co-ordination of all major hardware and software changes.
- Liaising with the management team and support services through daily and weekly review meetings.

The ideal candidate, man or woman, will have a basic knowledge of computer operations, possibly as a senior operator or a shift leader. Experience with IBM System 370 hardware and software is essential.

To discuss this position further, please telephone Doug Hazell on 01-637 7141, or write to him at:

BOC Datasolve

BOC Datasolve Limited,
London Central Datacentre,
214 Oxford Street, London W1N 0BR.

UNIVERSITY COLLEGE, CORK

COMPUTER BUREAU

The Computer Bureau provides comprehensive computer services for academic departments and the College administration. Interactive computing facilities are supported by a recently-installed IBM 370/138 Computer with 1Mb of main store and 700Mb of 3340/3344 disk storage. The system runs under VM/370 & CMS and is available 24 hours a day 7 days a week.

Additional staff are required as part of the Computer Bureau's development programme, and applications are invited for the following posts —

HEAD OF SYSTEMS PROGRAMMING AND SUPPORT

(£5,940-£7,119)

The Head of Systems Programming and Support will be in charge of a small high-calibre team responsible for systems development and support. This is a key post and the successful candidate will be expected to play a major role in forward planning as well as providing day-to-day support for current systems. Extensive experience in systems design, and programming and the support of multi-access systems is essential, as is a mature personality. Preference will be given to candidates with expertise in project management, computer networks or data base systems.

SENIOR SYSTEMS PROGRAMMER

(£4809-£5921)

The Senior Systems Programmer will assist in the development and maintenance of systems software and the support of the 370/138. Previous systems programming experience is considered essential for this appointment.

OPERATIONS MANAGER

(£4939-£5921)

The Operations Manager will be responsible for job reception and despatch, data preparation and control and computer operations. Candidate should have extensive experience in these areas, a working knowledge of programming and previous experience of multi-access operations.

SENIOR ANALYST/PROGRAMMER

(£4939-£5921)

The Senior Analyst/Programmer will be responsible for administrative and financial applications within the College. Plans have been drawn up to computerise the College Library with on-line links to the British Library BLAISE system.

Previous experience in commercial data processing systems is essential and candidates should have successfully taken at least one major project from initial design to production running and evaluation.

ANALYST/PROGRAMMER

(£4081-£5080) OR

TRAINEE ANALYST/PROGRAMMER

(£3475-£3881)

The Analyst/Programmer will be working on administrative and financial applications as described above. The level of appointment will be determined by previous systems analysis and programming experience and by formal qualifications.

Application forms and further particulars are available (by postcard please) from

Establishment Officer
University College, Cork, Ireland

Closing date for completed applications is **Monday, 26 September, 1977**

SENIOR SYSTEMS ANALYST & PROGRAMMERS

Due to internal promotion we have a vacancy for an experienced Senior Systems Analyst.

The successful applicant will have at least 3 years experience in Systems Analysis and will be thoroughly familiar with all aspects including the implementation of package programs. Experience of working with computer based engineering production control systems would be an added advantage.

We also have vacancies for experienced Programmers. Applicants should have at least 2 years' Programming experience preferably in Cobol. Knowledge or experience of on-line techniques would also be an advantage.

Applicants should write stating their age, experience and current salary to: Mr A Cockram, Personnel and Training Manager, Armitage Ware Limited, Armitage, Nr. Rugeley, Staffs.

armitage shanks

Armitage Ware Limited
Armitage, Rugeley, Staffs, WS15 4BT

CONTRACT

PROGRAMMERS AND CONSULTANTS

☐ **IMMEDIATE VACANCIES up to £300 p.w.**

Consultant/Intelligent Terminals	S. Yorks.
Database Consultant	S. Yorks.
IBM Design Consultant	S. Yorks.
PL1/IMS Programmers	London/B. Coast
BAL/CICS Systems Programmers	London
COBOL/OS Programmers	B. Coast
COBOL/DOS Programmers	London
COBOL/1900 Programmer	London
COBOL/BAL/OS Programmers	London
+ many others	
Systems 4/Usercode Programmer	Surrey

☐ **IF YOUR CONTRACT:**

ends in the next 3 months then REGISTER with us now and we'll have a new assignment ready for you.

top slot

CALL Doreen Friedlander 838 0400
or
WRITE 22 Garrick Street London WC2E 9BJ

Basingstoke District Council

Computer Programmer

AP4/5 £3366-£4095 plus supplements of £496 approximately per annum

Applicants are invited for this post in the Finance Department. ICL 2904 32K installation with 2—EDS 80 and 4 tapes. Preference will be given to candidates with good experience of COBOL JCL/GEORGE IS and Find II and ICL Software.

The post is superannuable and housing accommodation may be available in appropriate cases together with assistance towards removal expenses if required.

For an application form returnable by 5th September, 1977, please telephone: Basingstoke 56222 ext. 207 or write to the Personnel Manager, Basingstoke District Council, Civic Offices, London Road, Basingstoke, Hants. RG21 2AJ.

Duncan Bransom Recruitment

Senior Programmer £6.500

A major development programme at HERTZ, the world leaders in the car rental business, means that they need the services of an additional senior programmer at their European headquarters at Isleworth, Middlesex.

The systems will be developed to operate on I.B.M. mainframe computers with non-I.B.M. minis front-ending to them.

Applicants should have at least five years' Cobol programming experience preferably using O.S., and should already be working as senior programmers or chief programmers.

Please write or telephone for an application form to:
Roger Griffiths, Duncan Bransom Ltd., 37 Hillcrest Road, LOUGHTON, Essex.
Telephone 01-508 5121

Duncan Bransom Limited

Computer Personnel International

110 St. Martin's Lane, London WC2N 4BH
Telephone: 01-836 6775

NEW - EXCITING - DIFFERENT

Heard it all before?
Heard of DATAPAD?

DATAPAD is new, it is exciting and its very different. For the first time, handwritten data is captured and validated at source. Obviously such a revolutionary device means new ideas in programming and systems design.

Computer Systems International, a London based Software House, is a major supplier of applications software for Datapad and offers superb opportunities for programmers to work on this unique and fascinating equipment.

A minimum of 1 year's experience is essential — Assembler and/or Cobol.

To find out more about C.S.I. and what they can offer you.

Contact Judy Graydon

OPERATORS SHIFT LEADERS DATA CONTROLLERS

I have lots of extremely interesting jobs on file for Operations Staff from Trainee Operator to Operations Manager. If you are contemplating a change why not ring me — I may have the perfect job for you.

STOP PRESS - SHIFT LEADER, CENTRAL LONDON. GOOD SUPERVISORY EXPERIENCE ON IBM EQUIPMENT ESSENTIAL. SALARY TO £6,000 p.a.

Contact Marily Davidson

PDP MARKETING SUPPORT OVERSEAS TRAVEL SALARY £7000 +

Our client has a vacancy for a SENIOR MARKETING EXECUTIVE to join a small highly professional team selling, installing and supporting turnkey PDP systems.

Applicants must be familiar with the problems of field engineering for mini systems yet have the confidence and personality to negotiate contracts with overseas clients. Preference will be given to candidates with an engineering background, but applications are welcome from people with other mini-related disciplines.

The position offers extensive travel and opportunity to use your technical expertise in an executive position.

To arrange a confidential interview
Contact: Linda Bensted

Real Time People — Computing Services Association — Computer Room People

---

GRAMPIAN HEALTH BOARD

PROGRAMMER/ANALYST

Applications are invited for the above post from persons with a serious interest in computing. In the first instance they will join a small team, based at the Computing Centre, Foresterhill, Aberdeen, using a Codasyl compatible Database Management System to develop an information system for the Grampian Health Board.

Two pilot services are in operation: (a) production of summaries of patient information for consultants in an outpatient clinic. (b) a waiting list system with automatic calculation of admission dates.

A knowledge of database techniques, the CTL Modular One and the Health Service is desirable, but more important is the will and the skill to make a worthwhile contribution to solving National Health Service information problems.

Salary: £4038-£4864 per annum, inclusive of earnings supplements. Four weeks' annual leave, nine days' public holidays, pleasant modern office accommodation, excellent canteen facilities.

Application forms and further details are obtainable from the Area Personnel Officer, Grampian Health Board, 1 Albyn Place, Aberdeen AB9 1RE, to whom completed applications should be returned by Friday, 9th September, 1977.

CLEVELAND COUNTY COUNCIL
COMPUTER SERVICES UNIT

SENIOR PROJECT LEADER

£5362-£5926 (incl. supplements)

Applicants must be able to supervise and control the work of programmer/analysts and project leaders in the development, implementation and support of computer systems — both batch and on-line. A good working knowledge of ANS COBOL, IBM OS/VS1 and CICS is essential, together with initiative, leadership and technical ability.

The central installation comprises an IBM 370/145 which is to be replaced by a 370/148 this autumn. A twin 370/138 configuration is on order for delivery 12 months later. These machines will support a sophisticated teleprocessing network servicing the requirements of four District Councils in addition to County Council Departments.

This is a senior management post and as well as the usual required skills the applicant must be able to demonstrate managerial capabilities.

Application forms and detailed job specification are available from the Director of Computer Services, 5th Floor, Rede House, 87 Corporation Road, Middlesbrough, Cleveland TS1 1LY. Closing date for completed application forms 9th September, 1977.

PRODUCT MANAGER + SALES EXECUTIVES

MODEMS
EXCELLENT SALARY PLUS CAR, ETC.
LONDON AREA

Our Clients are one of the largest and most successful U.K. companies with an enviable reputation in the field of data communications. They have many years' experience of developing the most efficient and cost effective teleprocessing systems and equipment available.

We have been retained to recruit key staff who are able to take advantage of the latest developments in this field and contribute to the success of the product.

Sales Executives should have an excellent track record of successfully selling data communications equipment.

The Product Manager will be responsible for ensuring that customer requirements are satisfied with respect to systems sold and subsequent systems implementation, and should have at least four years' experience in data communications.

For further information please contact the Advising Consultant, quoting reference CW48.

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.

01-353 6187 (Office Hours)
01-353 1436 (Ansafone Service)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

[illegible]

SCIENTIFIC PROGRAMMER/MATHEMATICIAN

Fortran/Assembler/RTII
Rural Nottinghamshire
to £4000

Here is an opportunity for a young graduate of mathematics or associated subject to become a key member of a small team developing systems for the analysis of geophysical survey data. This post is the first appointment in this field and requires good mathematical ability together with some experience of **FORTRAN/ASSEMBLER** programming. The environment is a **PDPII DISC-RTII** fully interactive graphics system with plotting facilities.

The Company is a world leader in its particular branch of energy technology and offers excellent security and career prospects in an attractive rural setting. Housing is plentiful and reasonably priced and working conditions are first-class.

For detailed job description and application form please apply to:

Mrs. Pat Adcock
BPB Instruments Ltd
East Leake
Nr Loughborough
Leics
Tel: NOTTINGHAM 214161

NORTH WEST THAMES REGIONAL HEALTH AUTHORITY
COMPUTER CENTRE

SENIOR SYSTEMS DESIGNER/PROGRAMMER

Vacancies exist for Senior Systems Designer/Programmers with at least two years' Systems Design and Programming experience, at the Authority's Computer Centre situated in its own grounds in New Southgate. The equipment currently in use is an ICL 1904S with communications facilities.

The successful applicants would be expected to work initially on Accounting and Payroll routines and experience in either of these procedures would be an advantage.

Salary Scale: £4008-£4983 p.a. plus £354 p.a. London Weighting. Earnings Supplement stage I of £312 p.a. and stage II of £208 p.a. are payable in addition.

Application forms and further particulars obtainable from the Regional Personnel Officer, North West Thames Regional Health Authority, 40 Eastbourne Terrace, London W2 3UR (Telephone No. 01-[illegible] Ext. No. 261), quoting reference number 187. Closing date 12th September, 1977.

INTERNATIONAL SOFTWARE SUPPORT

Base S.W. London – £6,000 negotiable

SDI are the creators of the successful systems software products GRASP, GRASPVS, FLEET and EPAT, which enhance the performance of IBM computers. Due to an internal promotion, we require a Senior Systems Engineer to be based at our international support centre in London.

The successful applicant will be responsible for:

- * Technical back-up for SDI's international systems engineering force
- * Supervising advanced testing of SDI's new facilities
- * Internal systems programming for SDI's own 360/40 computer
- * Assisting in SDI's expanding training programme

Applicants must have the minimum following qualifications:

- * Education to GCE 'A' level standard
- * Good IBM DOS or DOS/VS operating experience
- * At least two years DOS or DOS/VS systems programming experience
- * Willingness to undertake occasional overseas visits
- * The ability to work without supervision

Please write giving full career details to:–

Personnel Manager, SDI ref LON/SE,
184 New Kings Road, London SW6 4NF.

SDI

Systems Development Manager

Zambia c£8,000

The Industrial Development Corporation of Zambia (Indeco) requires a Systems Development Manager to ensure the successful computerisation of its 36 Group Companies.

Candidates will be based in Lusaka and will have the responsibility of controlling the operation of two computer centres, sited in Lusaka and Ndola. The Lusaka centre is currently being upgraded with an IBM 370/115 running under DOS/VS and POWER/VS, whilst the Ndola centre has an IBM 3/10.

Applicants should have at least five years' management experience in medium sized computer centres processing; sound knowledge of systems analysis; experience in IBM 370's running under DOS/VS; knowledge of CICS, COBOL and/or RPGII and the ability to train local staff.

Salary will be in the region of £8,000 inclusive of gratuity and other benefits include ★ subsidised furnished accommodation ★ Children's education allowance ★ car running allowance ★ car loans at minimal interest rates ★ baggage allowance ★ settling-in allowance and air fares for the appointee and family to and from Zambia ★ 8 weeks annual leave ★ ⅓ of salary remittable under current regulations. The country enjoys a pleasant sunny climate and affords excellent social amenities, including free education and medical facilities.

Brief but comprehensive details of age, education, qualifications, experience and salaries drawn should be sent immediately in complete confidence for an early interview:

**Recruitment and Administration Manager,
Zimco Services Ltd., Zimco House,
129-139 Finsbury Pavement, London EC2A 1NA**

OVER THE BRIDGE TO WALES FOR SYSTEMS AND PROGRAMMING STAFF

We are currently recruiting for clients based at various locations in South Wales and South West Wales. Vacancies include:

SYSTEMS PROGRAMMER — Ideally ICL 2900 but other relevant experience considered. Salary to £5,000 negotiable.

PROGRAMMERS — ICL 1900 Cobol/Plan. Salary to £4,000.

SYSTEMS ANALYSTS — Primarily financial applications. Salary to £4,200.

Similar vacancies also exist with installations throughout the West and South West of England. For further details of these and other vacancies, write or telephone:

ata

**Richard Cove 0272 211035
ATA SELECTION
36/38 Baldwin Street, Bristol 1**

Senior Computer Programmer

for

Central Trustee Savings Bank Limited

We seek to appoint a senior programmer who will join a small team responsible for the support function within the Data Processing Department. We are an expanding organisation, currently employing 450 staff and the person appointed will play an active role in helping to achieve our expansion programme.

The computers are used for various clearing applications and the successful candidate should have approximately three years' experience of programming including IBM Basic Assembler and IBM Cobol under DOS. Knowledge of mini computers is desirable but not essential.

We envisage a salary in the range £4218/b4/9 per annum inclusive of London Weighting and supplements. In addition there are excellent benefits including a comprehensive non-contributory superannuation scheme, season ticket loans and mortgage subsidy scheme.

Will applicants please write giving full details (or telephone for an application form) to:

**Mrs. M. A. Wright
Central Trustee Savings Bank Limited
3 Gracechurch Street
London EC3P 3BX
Tel: 01-283 8633**

TSB

SENIOR OP
c £3800 p.e.
Honeywell OS 2000
City

Phone 01-439 6481
(24 hours)
EFFECTIA GRAVIS
Personnel Consultants

CONTRACT OPS
2980/70 VME8/K
IBM DOS
Top Rates

Phone 01-439 6481
(24 hours)
EFFECTIA GRAVIS
Personnel Consultants

NEWCASTLE-UPON-TYNE POLYTECHNIC
Computer Unit

SENIOR PROGRAMMER (PROJECTS)

(£3828-£4035 plus £312 and up to £179.76 per annum. Salary Supplements)

Required to direct major software schemes for an IBM 370/168 with special responsibility for the system software associated with the Polytechnic's three Data General NOVA minicomputers.

Applicants should have a degree or equivalent professional qualification and a maximum of two years' programming experience. They should have a strong software background in both main-frame and minicomputer systems. Some experience of project control and documentation is desirable.

NJC Salary and Conditions AP 5.

For further particulars and application forms, returnable by Friday 9th September, 1977, please send stamped addressed foolscap envelope to the Staffing Officer, Newcastle-upon-Tyne Polytechnic, Ellison Building, Ellison Place, Newcastle-upon-Tyne NE1 8ST.

MERSEYSIDE COUNTY COUNCIL

SOFTWARE MANAGER

£4899-£5877 per annum, plus supplements

The installation is a 192K 1904S under George 3. Batch and online applications are being developed with data base projects under consideration. Cobol, Plan, and Fortran batch systems are in existence with online systems utilising Communications Manager, Datadrive and Spode.

The person appointed will be directly responsible for the maintenance of the operating system, and software in the areas of communications, libraries and utilities of which he/she will have wide experience.

Applications to: Personnel & Correspondence Section, Merseyside County Treasury, P.O. Box 95, Metropolitan House, Old Hall St., Liverpool L69 3EL. Closing date: 12th September, 1977.

CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC

CSC

NEED

CONTRACT

ANALYSTS & PROGRAMMERS

WHENEVER YOU ARE AVAILABLE PLEASE LET US KNOW. WE WILL MEET YOU AT YOUR CONVENIENCE

CALL US BANK HOLIDAY MONDAY

Some of CSC's immediate project requirements:

SYSTEMS DESIGNER. City of London
IBM DOS COBOL. West End
CHIEF PROGRAMMER IBM OS COBOL. South Bank
BURROUGHS 6700 COBOL. Croydon
IBM DOS COBOL, DL1. South Coast, Surrey
PL/1, BAL. City of London
SENIOR ANALYSTS. South Bank, Sussex
IBM OS COBOL, MARK IV. West End

Phone or write

central systems consulting

**12 HOLLYTREE CLOSE, INNER PARK ROAD,
LONDON SW19 6EA
Telephone: 01-789 3144 (until 10.00 p.m.)**

CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC CSC

Systems Development in the City

Up to £6,500 (Opposite Liverpool Street Station)

SYSTEMS ANALYSTS

Two experienced systems analysts are required to join an expanding development department working on both batch and on-line systems. The positions are permanent and could therefore both be ultimately in teams developing on-line systems, however the initial requirements are:

(I) In the maintenance project team on both large and small scale maintenance.

(II) In a development project team possibly developing an on-line enquiry system.

In both positions training will be given where appropriate but applicants must have a minimum of two years' systems experience. Salary is dependent upon previous experience but could be up to £6,600.

- ★ 33-HOUR, FLEXTIME WORKING WEEK (PLUS SOME OPPORTUNITY FOR OVERTIME)
- ★ NON-CONTRIBUTORY PENSION
- ★ FREE LUNCHES
- ★ SEASON TICKET LOANS
- ★ MORTGAGE SCHEME

Please telephone or write to: F. W. Lee, Staff Manager, Provident Life Association of London Limited, 266 Bishopsgate, London EC2M 4QP. Tel: 01-247 3200.

PROVIDENT LIFE
ASSOCIATION OF LONDON LIMITED
266 BISHOPSGATE LONDON EC2M 4QP

OPERATORS

AMERICAN BANK NEAR CHARING CROSS

An expanding American Bank with brand new offices close to Temple and Charing Cross stations needs three experienced operators to make up the five person team running their new PDP 11/55 Mini installation.

Two operators (one not starting till January) will work alternate shift hours 8 a.m.-4 p.m. and 3 p.m.-11 p.m., the other will become the shift leader responsible from 3 p.m.-11 p.m.

The salary is according to age and experience but will be a BASIC of up to £3,300 plus shift allowance.

Fringe benefits include an annual BONUS, subsidised MORTGAGE, SEASON TICKET and PERSONAL LOAN SCHEMES and FREE lunch facilities.

**Call Maureen Cross on 404 5701
CRIPPS SEARS AND ASSOCIATES**

Cripps, Sears

Holland Nijmegen

Initial Contract which could lead to permanent

- ★ But without the living costs of the larger better known cities
- ★ A progressive alert company with a DP unit committed to expansion
- ★ There is free tuition at the university language laboratory
- ★ A lively university town near the German border
- ★ Are looking for good staff who wish to live and work in Holland
- ★ Where applicable, for both married and single staff a relocation allowance would be made

Our clients believe that they have a lot to offer to the right people who are prepared not only to work for but to contribute to future developments of an unquestioned market leader. They require the following staff for both the DP unit and also a user department.

Programmers to FLS 35000
Programmer/Analyst to FLS 40000

If you have the following experience and are interested in these positions we would like to hear from you as soon as possible.

**Strong COBOL background (some RPGII would be useful).
Good DOS/VS experience
Multi application background (preferably in manufacturing areas).**

Our clients will be conducting interviews in the UK within the next 14 days

Please apply without delay to Gordon Cairns quoting reference no. C/690.

Computing Services Association

**John Goldsmith (Computer Services) Limited
15 Buckingham Palace Road, London SW1
Tel: 01-828 8358, 24-hour answering service**

JOHN GOLDSMITH (Computer Services) Ltd.

Edinburgh

Senior Systems Analyst/Programmers	£4477-£5518
Systems Analyst/Programmers	£3975-£4915
Programmers	£3241-£4343

(all inclusive of Supplements)

We are looking for experienced computer professionals to join our Development Team, working on a wide range of batch and remote terminal projects.

Successful applicants will have COBOL, USERCODE or ASSEMBLER experience, preferably on I.C.L. System 4 or I.B.M. 360/370 equipment. In addition, candidates for Systems Analyst/Programmer and Senior Systems Analyst/Programmer posts should have a proven record of achievement in systems analysis and design.

Initial placings will be according to experience.

Application forms from Computer Development Manager, Lothian Region Computer Centre, 323 High Street, Edinburgh EH1 1PG. Tel. 031-229 9292 ext. 3321.

Lothian Regional Council

SALES EXECUTIVES

Delta Data Systems

Limited

**Swallowfields · Welwyn Garden City · Herts.
Telephone: Welwyn Garden 35833**

Further expansion, due to the continued success of our programmable Video Display Terminals, and other computer peripherals, means that we can offer exceptional opportunities to self-motivated Sales Executives.

You will join our existing sales team selling a first class range of micro-processor-based terminals and you will have the full backing of our Sales and Technical Support organisations.

If you have current experience in selling Video Display Terminals, Floppy disc systems or similar peripherals, and have a sound knowledge of data communications and data entry techniques we would like to hear from you. We can offer you a high basic salary and substantial commission — which should put your earnings into five figures — a new car and a high degree of autonomy.

Apply in writing, giving brief career and personal details, or telephone Ken Rumsey for an initial discussion.

SUMMER SNAPS!

Systems Consultants £6,000-£9,500

CENTRAL LONDON

Seven large well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require a first rate service. Technical communications consultants are also required where in-depth implementation experience of IBM or ICL T/P message switching networks etc., are essential. Excellent fringe benefits and prospects.
CW 34/1 Michael

Junior Programmers £2,500-£3,750

LONDON, HOME COUNTIES

Only one year's experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you.
CW 34/2 Annette

Operators to Shift Leaders £2,000-£4,000 (incl.)

LONDON & HOME COUNTIES

We have many vacancies covering all types of machines and locations. Some firms will retrain from one manufacturer to another. Remember these positions are for shift working only. Hurry whilst stocks last.
CW 34/3 Annette

Contract Programmers to £190 p.w.

U.K.

Immediate requirements for IBM COBOL under DOS or OS for C. London. PL/1, OS or CICS, PDP/11 or good IMS for various locations for 3 months plus. Also IBM vacancies in GERMANY, FRANCE, BELGIUM & HOLLAND. Ask for the Contracts Officer on 01-995 2236.
CW 34/4 Michael

Successful Salesmen to £12K quota earnings

U.K.

We now have ten different firms for both hardware and systems only companies who are anxious to meet successful salesmen in this industry. They must have previous relevant small systems experience (some VRCs will be considered). All firms have bonus schemes and cars or car allowance. Most positions in S.E. England, but 2 in Midlands.
CW 34/5 Michael

Mini Computer Programmers to £5,950

U.K.

Your experience is required now. A very large number of vacancies are registered where a knowledge of Assembler or communications experience is essential (VRC programmers would also be considered). Opportunities exist in S.W., N.W. or W. London, Surrey, Herts. and Manchester in this exciting and rewarding field. There has also been registered some overseas posts to people with 5 or more years in mini computers.
CW 34/6 Michael

Time Sharing Programmers to £6,000

C. LONDON

If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in pre- or post-sales support. Some offer generous bonus schemes.
CW 34/7 Michael

UCD

DATA EXPRESS HOUSE
PROSPECT PLACE
HEATHFIELD TERRACE
CHISWICK W4 3BR
Recruitment Consultants

**01-995 3883 or
01-958 6138 evenings**

SYSTEM/3 STAFF

DATA PROCESSING MANAGER	c. £6,000
PROGRAMMER/ANALYST	c. £4,500
DATA PREP./COMPUTER OPERATOR	c. £3,250

Alberto Culver Co. need the above staff for their established S/3 Model 8, shortly to be moved to Basingstoke.

If you have relevant experience of RPG II, S/3 and 3741/2, write with career details or phone: Norman Lindsay, Alberto Culver Co., 44/46 Newington Causeway, London SE1 6DX. Telephone: 01-407 1623.

Senior Systems Analyst

(Salary £5500 minimum including London Allowance)

MOBIL OIL COMPANY LIMITED requires a Senior Systems Analyst to strengthen our Management Science Department in our London Head Office.

Candidates must be mature, able and capable of developing and evaluating opportunities for Computer commercial systems by conducting scoping and feasibility studies culminating in Business Systems specifications in a variety of areas throughout the Company. Imagination, the ability to take a broad view of business problems and to communicate effectively with both user and technical staff are held to be important attributes for the job.

The position requires the ability to plan, design and control projects from inception to implementation and to ensure that the overall process of change is carried out in the user environment with the minimum of disruption.

Applicants, male or female, should have a degree or equivalent professional qualification with at least four years' practical experience of commercial systems analysis/design, ideally as a project leader. Some familiarity with time-sharing applications, including programming ability is desirable.

Please write with details of age, qualifications, experience and present salary to:

**P. J. Johnston
Mobil Oil Company Ltd.
54/60 Victoria Street
London SW1E 6QB**

Mobil

FOOD FOR THOUGHT
WEST MIDLANDS

JUNIOR PROGRAMMER

SALARY TO £3,200 p a

An additional programmer is required to join the Management Services Team of a major company within the food industry.

Major enhancements within our client's Computer Services Department include the development of the latest data-processing techniques utilising

REAL-TIME, INTERACTIVE PROCESSING, MULTI-PROGRAMMING and REMOTE COMMUNICATIONS

Applicants should have:—

★ Nine to eighteen months' programming background.

★ Experience of ICL COBOL, gained in a commercial environment.

This is a truly excellent opportunity for a Junior Programmer seeking his/her first position of responsibility within a data processing department that promotes active training and offers genuine career prospects within a Real-Time environment where experience can be gained across the commercial spectrum.

Usual large company benefits apply, including relocation assistance where necessary.

CONTACT: REG HEATH on 021-236 3781 REF 77/08/18

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

SCR

SENIOR OPERATIONS OPPORTUNITIES

Shift Manager : £5,800-£6,200
Senior Operators : £4,600-£5,000

As a national leader in the competitive multiple retail trades, Tesco must move with the times. We have always been an innovative Company. We were one of the first V.D.U. users in the country.

Currently hardware installed at our Cheshunt Head Office includes three ICL 1904S 96K computers, 24 EDS 60's, 80 V.D.U.'s full teleprocessing facilities. With major hardware investment coming up in the very near future we are seeking experienced senior staff to strengthen our existing operating team.

We require:

SHIFT MANAGER

At least five years' experience in a senior position on ICL 1900 equipment and extensive supervisory experience within a large multi-machine installation.

SENIOR OPERATORS

A minimum of three years' experience of ICL 1900 George II installations. Supervisory and multi-machine experience are preferable.

These vacancies will involve working a rotating shift system and will be based at Head Office in Cheshunt, Herts.

In addition to salary, Tesco can also offer a wide range of fringe benefits which include a contributory pension scheme, subsidised restaurant facilities and an excellent Country Club. Assistance with relocation costs will be given where necessary.

These are equal opportunity vacancies and applications should be made by completing and returning the coupon to

Mr. S. D. Whitbourn
Personnel Officer
Tesco Stores Limited
P.O. Box 18
Delamere Road
Cheshunt
Waltham Cross
Herts. EN8 9SL

JOIN THE
LIVELY SCENE AT
TESCO

CONTRACT OPS
2980/70 VME8/K
IBM DOS
Top Rates

Phone 01-439 6481
(24 hours)
EFFECTIA GRAVIS
Personnel Consultants

★ CONTRACT ★ PROGRAMMERS
RING 01-388 0036

Work with an established software house. London based. 6-months' contract waiting for people with IBM OS/COBOL or OS/FORTRAN 4.

Also requirements for good COBOL on any machine.

We're expanding

Tektronix, an American based company with a worldwide turnover
in excess of five hundred million dollars, is expanding rapidly.
Already we are established as world leaders in graphics terminals
and it is in this particular field that our U.K. growth is most rapid.
We are anxious to hear from people with related experience
in graphics terminals and associated computer
products to fill the vacancies detailed below.

North-west area Sales Executive

This important sales post will ideally suit someone who is keen to progress and has two to three years' successful selling experience in the computer field. They should have advanced educational qualifications and preferably some programming experience.

The product range includes computer-based graphic systems, plotters, hard copy units and associated peripherals.

A company car is provided and the position is based at our Manchester office.

Software Analyst

Responsible for wide-ranging support of both salesmen and customers. Specific functions will include systems analysis and advice on system configurations; definition and development of application software; customer liaison and seminars.

The software analyst will specialise in the 4051 Graphic Computing System. The work will involve a much greater variety of challenge and experience than the usual programming environment.

Applicants should be educated to degree standard in a computer-related subject, have a good scientific background, be experienced in programming FORTRAN or BASIC. Should preferably have had two or more years' experience of systems analysis in a mini-computer environment.

Very close co-operation with the salesforce will be involved and applicants should have the ability to contribute effectively in a team selling situation. This vacancy is based at Harpenden.

Marketing Support Assistant

Responsible for marketing support for all our computer products. This will include administration of the mailing list, organisation of exhibitions, analysis of competition, preparation of demonstration aids and handling customer enquiries.

Applicants should be educated to H.N.C. standard or above and should preferably have sales-related experience in the computer industry. Some familiarity with programming is desirable. Close liaison with our salesforce is necessary so a desire to work in a sales environment and the ability to communicate clearly and effectively are essential. This vacancy is based at Harpenden.

At Tektronix we believe in looking after people. All the above positions offer an excellent salary in line with their importance and commissions are paid where applicable. The company offers a secure and progressive future with company pension schemes and various fringe benefits. If you are interested in one of these positions we would love to hear from you, so please write in the first instance with a curriculum vitae to Howard Rippiner at our address shown below.

Tektronix®
COMMITTED TO EXCELLENCE

OEM Sales Executive

The applicant for this position will have had two to three years' successful selling experience in the computer OEM market. They will have full responsibility for expanding business with our existing OEM customers and seeking out new market areas throughout the U.K.

In addition to selling OEM products they will also be selling our extensive range of graphic terminals and peripherals.

A company car will be provided and the position will be based at Harpenden.

Product and Marketing Support Engineer

Responsibilities include assisting salesman/customers with the technicalities of hardware 'specials' on our product range, assistance with technical seminars and training courses, answering customer's technical queries by telephone and letter and administration of our demonstration pool.

Applicants should be educated to H.N.C. standard or above, and it is expected that they will currently be working as customer support engineers within the computer industry. Sales-related experience and some programming experience is desirable. A desire to work in a sales environment is essential, as is the ability to communicate clearly and effectively. This vacancy is based at Manchester.

Tektronix U.K. Ltd., P.O. Box 69, 36/38 Coldharbour Lane, Harpenden, Herts.

ARE YOU READY TO JOIN EUROPE'S LEADING FIRM OF CONSULTANTS?

S.E.C.S. PERSONNEL HAVE BEEN RESPONSIBLE FOR A VARIETY OF MAJOR SOFTWARE AND HARDWARE DEVELOPMENTS WITHIN THE COMPUTER INDUSTRY AND WE ARE NOW SEEKING ADDITIONAL PROFESSIONALS TO JOIN OUR VARIOUS OPERATING DIVISIONS THROUGHOUT THE:

UNITED KINGDOM & WESTERN EUROPE

MINI-COMPUTING

This Division of the Company is committed to a variety of Commercial and Scientific projects involving the use of sophisticated hardware and software techniques. We are urgently seeking the following personnel capable of working on their own initiative or in project teams.

SENIOR PROGRAMMERS
£7500-£9000 p.a.

Excellent opportunity to work on varied assignments involving processor to processor communications networks.

Minimum of 2 years' PDP 11 experience, with working knowledge of the RSX 11 Operating System.

Experience of CORAL an advantage but not essential.

PROGRAMMERS
£4500-£7000

Minimum of 12 months' PDP-11 experience preferable with knowledge of the RSX 11 M operating system. Experience of the RTL 2 high level language would be useful but not essential.

IBM-COMPUTING

S.E.C.S. is totally committed to the application of data base and teleprocessing design.

We are urgently seeking the following categories of personnel who can expect to work on a wide variety of interesting projects and to enjoy the many benefits of working for a large consultancy practice.

ANALYST/PROGRAMMERS
£6000-£9000

With a minimum of 4 years' IBM commercial experience and a sound knowledge of OS, BAL and an appreciation of DOS.

SENIOR PROGRAMMERS
£6000-£8500

With a minimum of 18 months' IMS PL/I data base experience on commercial applications. A knowledge of DB/DC would be desirable but not essential.

ANALYST/PROGRAMMERS
£6000-£9000

Minimum of 5 years' computing experience with a major computer manufacturer, with at least 12 months' recent involvement in the design and programming of a commercial data base application.

A sound knowledge of IMS would be a distinct advantage, as would be COBOL or PL/1. Consideration will be given to suitable applicants with other data base expertise.

FOR FURTHER INFORMATION ABOUT THE CAREER OPPORTUNITIES WITH S.E.C.S. WRITE OR TELEPHONE:

MISS SALLY BIGGS (QUOTING REFERENCE RSB/60), CONSULTANT LIAISON OFFICER

SOUTH EASTERN COMPUTER SERVICES
SOUTH EASTERN HOUSE
3/5 OLD BRIDGE STREET
HAMPTON WICK, KINGSTON-UPON-THAMES, SURREY

TEL. 01-977 5321 (A CONSULTANT WILL BE AVAILABLE AT ALL TIMES TO DISCUSS THESE OPPORTUNITIES

[illegible]

Datasolve

SHIFT LEADER

£4000 Circa according to experience

Required to work on a 3 shift system in a demanding environment with ample scope for advancement.

ANALYST/PROGRAMMER

£3700-£4500

Applicants should have a minimum of one year's analysis experience and a sound programming background.

PROGRAMMER

£3500-£4300

Applicants should have a minimum of two years' Cobol experience preferably on ICL 1900 equipment.

The Systems and Programming department are currently developing new systems and enhancing the On-line System.

The equipment is an ICL 1902T 64K with EDS 60's, 80KCS 9 Track Tape decks using the G II Operating system which includes a communications system using ICL driver.

Fringe benefits include a Toyota Car purchase scheme. Flexible working hours (for the programming appointments).

Write or telephone for application form to.—

D. H. King *(Data Centre Manager)*
Toyota (GB) Ltd.
Fleming Way
Crawley, Sussex
Tel: Crawley 33885 or 33558

BOC Datasolve

QUEEN MARY COLLEGE
University of London

COMPUTER CENTRE USER DOCUMENTATION

Applications are invited from graduates with computer experience and the ability to write clearly and concisely. The successful candidate will be responsible for writing user documentation describing both the services available to computers users and how to use them. The Centre currently provides a large multi-access service on twin ICL 1904S's, for both research and teaching throughout the University of London. An ICL 2980 is expected to be installed and a major part of the documentation produced will be for the services developed on this new computer.

Salary in range £2804-£4811 per annum, plus £450 London Allowance. Applicants should write, giving full details (including the names and addresses of two referees) to The Registrar (CW), *Queen Mary College*, Mile End Road, London E1 4NS

Freelance Experienced PLAN Programmer

Romford, Essex

£185 per week

Must have experience of George 3 operating systems and PLAN programming. Required immediately for 3 months' contract with possible option of monthly renewal

Apply in first instance to M. Doglish, Austin Knight Ltd., 20 Soho Square, London W1A 1DS

SOFTWARE DEVELOPMENT

SDI is expanding its software development capability and new employment opportunities are consequently available. It is the leading supplier of packaged Systems Software, being responsible for such packages as GRASP, GRASPVS, EPAT and FLEET, and operates in many countries having more than 200 employees.

You will be located initially in London and after successful completion of a three month probation period will be transferred to SDI's Research and Development centre in Hamilton, Bermuda. Bermudian applicants are especially welcome.

SDI owns and operates a large IBM 370/135 computer in Hamilton. There are VDUs and a TP link to the U.S.A. The entire computer installation is dedicated to software development, so the facilities and turnround are of the very best.

Vacancies exist within SDI for Senior Software Developers and Software Developers. This is an opportunity to participate in the development of Systems Software packages with the industry's leading specialist company in this field.

The required qualifications are:–

* First-rate assembly-language programming ability;
* Familiarity with IBM DOS or DOS/VS internals;
* Willingness to work hard;
* For Software Developers, a minimum of 2 years recent IBM DOS or DOS/VS experience;
* For Senior Software Developers a minimum of 5 years recent IBM DOS or DOS/VS experience, and preferably experience of supervising others.

Bermuda is a conservative British Colony in the mid-Atlantic, less than two hours from New York. It has a pleasant climate and stable government. Salaries are paid in US dollars and there is no Income tax. SDI will assist in obtaining work permits for successful applicants (who must have a maximum of two dependent children). A relocation allowance will be paid.

Applicants for these positions should submit an example (about 200-300 lines) of their IBM DOS (/VS) coding, together with a completed application form.

An application form, or more information about SDI or about Bermuda may be obtained by telephoning Merlon Lustig at SDI London, (01) 731 4313. If you wish to apply for one of these positions you must do so in writing to:

Personnel Manager,
SDI, Reference BDA/SD,
184 New Kings Road, London SW6 4NF.

SDI

Computer Appointments Register

OPPORTUNITIES IN CENTRAL LONDON

Our client a leading company in the world of finance is offering the following challenging opportunities in data processing.

SYSTEMS DESIGNER to £5400

The ideal applicant should have approximately 4 years' programming experience, preferably IBM ASSEMBLER with some CICS experience. A knowledge of design would also be an advantage.

PROGRAMMERS to £4300

The applicants should have at least 1 year's experience of CICS and IBM ASSEMBLER.

OPERATORS to £3800

At least 12 months' operating experience under DOS, GRASP and CICS would be an additional advantage.

These positions offer competitive salaries and the usual large company benefits, namely 4 weeks' holiday, a non-contributory pension and mortgage facilities after 3 years.

IF YOU ARE LOOKING FOR A DEMANDING YET REWARDING CAREER, RING JOHN FARGHER (REVERSING CHARGES) ON 01-438 6299

Computer Appointments Register

Regent House, 54-62 Regent Street, London W1A 4YJ. Tel: 01 439 6299   a member of The Federation of Personnel Services

---

SHIFT SUPERVISOR
c £4500 p a
IBM OS JCL
London

Phone 01-439 6491
(24 hour)
EFFECTIA GRAVIS
Personnel Consultants

SENIOR OP
c £3800 p a
Honeywell OS 2000
City

Phone 01-439 6491
(24 hour)
EFFECTIA GRAVIS
Personnel Consultants

We are looking for

OPERATORS AND SENIOR OPERATORS

(Male or Female)

Up to £4020 p.a.

Who is?	**Leicester Building Society** — one of the big ones.
What machine?	**Burroughs twin B3700,** 700 megabytes of disc, 6 tape drives, 2 printers, and data communications.
Developments?	**Expansion of data communications** to all branch offices over the next few years.
Shift work?	**Two shifts,** sometimes three, Monday to Friday, and Saturday overtime.
What experience?	**At least two years,** preferably on a Burroughs machine, in a multi-programming environment.
Any prospects?	**Early promotion** for the right abilities.
Where is it?	**Modern offices,** in pleasant surroundings, on the edge of Leicester.
Salary?	Dependent on experience, within the ranges: Senior Operator £3100 to £4020 Operator £2800 to £3500 including shift allowance; overtime pays more.
Fringe benefits?	What you would expect from a progressive organisation, plus housing finance on very favourable terms.
Where to write?	The Staff Manager Leicester Building Society Oadby, LEICESTER, LE2 4PF

Senior Systems Programmer

Surrey ***c. £5,500***

The UK Group of a major international company having a 370/158 and 155 configuration, is expanding its DP Commitment and needs a SENIOR SYSTEMS PROGRAMMER to take responsibility for generation, maintenance and support of existing and new software, tuning operating systems, bench marking, guiding applications personnel, advising management and liaising with Hardware C/E.

Future Company plans include the use of VM/370 during 1978 and MVS in production by the end of 1978. The successful applicant will have a large part to play in both the planning and implementation of these objectives.

Applicants should be self-motivating, able to communicate at all levels and flexible in their approach to the post. Minimum qualifications are 'A' levels with experience of systems and operations, supported by a sound knowledge of JCL, BAL and a high level language.

The company provides excellent benefits including help towards removal expenses where necessary.

Please telephone CROYDON office to discuss with our consultant quoting ref: CW53-7B.

01-688 9693 (24 HOUR ANSAPHONE) | 061 236 2419 FAULKNER HOUSE,
19 PARK STREET, CROYDON, CR9 1TN | FAULKNER STREET, MANCHESTER M1 4YD

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS
CAPP ASSOCIATES
LONDON AND MANCHESTER

Edmund Howard's Client Album

TEST PROGRAMMERS — HERTFORDSHIRE — SALARY C. £5,000

Experienced programmers are required to work in the Product Test department of our Client's Software Development Headquarters. *Main responsibilities* will include developing tests and conducting trials of newly developed software prior to general release. The ability to write comprehensive reports and negotiate test objectives is essential.

Candidates should possess a practical approach to problem solving and an appreciation of the eventual users requirements which should reflect in the completed product. Rapid career advancement is envisaged for those with relevant experience wishing to capitalise on their present expertise. For further details please quote CW148.

DEVELOPMENT PROGRAMMERS — HERTFORDSHIRE — SALARY UP TO £6,000

One of the world's leading computer equipment manufacturers is currently recruiting experienced programmers to work on the development of new products within their European Software Development Group. Candidates' experience should stem from a computer manufacturing background with a strong bias towards assembly level programming. A working knowledge of Disc based systems plus some communications experience would be a decided advantage.

This is a unique opportunity to join a rapidly expanding department where you can develop your talents to the limit. Career prospects are excellent within the department. For further details please quote CW149.

SOFTWARE CONSULTANTS (1903 going to 2960) — ESSEX — C. £6,000

A leading manufacturer of precision engineering products is currently seeking a software specialist with at least five years' experience in systems programming.

The person appointed will report to the C.S.M. and be responsible for software evaluation, software planning and maintenance and also the training of systems and programming staff in current software developments.

The company has plans to develop extensive real-time systems for its commercial and manufacturing activities. An *ICL* 2960 will be installed in a new computer suite towards the end of 1978 to support these developments and will utilise VME/8 TPS 1900 and DME.

Current systems are based on an ICL 1903A running under GII+.

This is an ideal opportunity for someone who wants direct involvement in the software activities associated with a large scale real-time system.

For further details please quote CW150.

TECHNICAL WRITERS — HERTFORDSHIRE — SALARY UP TO £5,500

Does your forte lie within the production of technical specifications and software manuals? If so, or even if you have two years' solid experience in a technical area, our client would like to meet you and perhaps offer you a more promising *career*

Firstly, there are one or two qualifying factors. The Organisation concerned is a manufacturer of intelligent terminals and computer peripherals who strongly believes that its biggest asset is its employee. This healthy working environment enables them to produce one of the finest products around, which gives you a rare opportunity for career progression with *exceptional security*.

Our client asks for people with the right personality to tackle and solve all manner of problems in close association with the software design and product test teams, and with the enthusiasm to maintain a high standard of documentation at every stage of their development projects. For further details please quote CW151.

Edmund Howard & Partners
Computer Personnel Consultants
5 Brighton Road, Surbiton, Surrey. Telephone 01-399 9183
38 Grafton Street, Dublin. Telephone 775 756.

Morganite Ceramic Fibres Limited...

....market leader in the field of high temperature insulation and manufacturer of Triton Kaowool Ceramic Fibre is expanding its activities in the *Wirral* area.

The company requires a:—

SENIOR SYSTEMS ANALYST to control new computer hardware and systems shortly to be installed.

Applicants of either sex should have experience of programming plus the design and implementation of on-line systems. It is unlikely that anyone under the age of 28 will have the required experience.

A good salary will be paid for the right person, plus relocation expenses to this rural area close to Chester and the North Wales coast.

Apply with C.V. to:-

D.B.A. COMPUTER SERVICES LTD.,
21, MORLEY ST. LONDON SE1.
Telephone: 01-928 4582.

Triton Kaowool ceramic fibre
Morgan

PROGRAMMERS REQUIRED BY COMPOWER

COMPOWER are looking for a number of COBOL programmers with at least two years' experience for work in a large IBM environment at Cannock, Staffs., on the development of commercial systems over a wide range of applications.

Starting salaries are in an initial salary scale which rises to £4,350 and beyond depending on performance.

COMPOWER is one of the largest computer service organisations in the country and it is a subsidiary of the National Coal Board. We run six computer centres across the UK with large sophisticated ICL and IBM equipment, together with a wide terminal network. Data base techniques and interactive services are used extensively.

COMPOWER offers a progressive career giving opportunities for promotion to senior posts.

Apply to Staff Manager,
Compower Ltd., Allport Street, Cannock, Staffs.,
or telephone Cannock 2581, extension

Compower

---

data base analysts

Littlewoods wish to appoint Analysts at all *levels* to assist in the design of Information Data Bases to satisfy a wide range of system needs involving both on-line and batch operations. Separate Data Bases are being drawn into a coherent entity through the construction of a Data Framework *in order* to provide an Integrated platform for future systems development.

Centred around triple H 66/60 processors the environment includes the use of IDS and MDQ techniques as well as Transaction Driven systems.

Applications are invited from men and women age 21+ who preferably *have some experience* of IDS, IMS, IDMS etc. but consideration will also be given to other applicants with systems awareness who wish to develop their careers in this new field.

Salaries and conditions of service are first class and generous removal expenses will be made available where appropriate.

Please write with brief career details of education and career to date to:—
Alan Picton, (Ref. 88 2508CW),
Appointments Manager, Littlewoods,
JM Centre, Old Hall Street,
Liverpool X L70 1A8.

Littlewoods

---

contract programmers

PROGRAMMERS AND TEAM LEADERS

We have a number of firm requirements for any 1900 COBOL programmers who will be available during the next three months and who are, or would like to be, based in or around the Basingstoke, Bournemouth or Southampton areas.

The projects are exciting and challenging so we'll need top flight professionals and we are prepared to match necessary skills with the highest rewards.

PROGRAMMERS IBM DOS/OS

In addition to the above, we have a few remaining opportunities in London and the East Midlands for talented IBM programmers who would enjoy an opportunity of expanding their skills into VSAM and IMS whilst being paid top contract rates.

Ring Roger Slade on 637-9898 during the day or leave brief details and a call back number for us on our diabolical machine.

P.S. We will be away over the Bank Holiday but back bright and early on Tuesday the 30th.

22 Newman Street, London W1P 3HB. Tel: 01-637 9898/7
Computer Consultants   London · Hamburg

euroco

SOUTH WESTERN REGIONAL HEALTH AUTHORITY

COMPUTER PROGRAMMERS—NETWORK COMPUTING

Salary Scale Junior Programmer (Trainee)

HIGHER CLERICAL OFFICER
£2181-£2691

PROGRAMMER GENERAL ADMINISTRATIVE ASSISTANT
£2691-£3534

INTERMEDIATE PROGRAMMER SENIOR ADMINISTRATIVE
£3534-£4344

Plus Phase I and II supplements

We need Programmers preferably qualified with a good grasp of programming techniques and fluent in COBOL. We use a Honeywell 2050 *which will be replaced with an ICL 2950 using VME/B in a* network environment, with ICL 2903/7502 equipment. Work on first stages of the network is starting now. Starting salary according to experience and qualifications. Application forms and job descriptions from Regional Personnel Department, Establishment Section, 26 King Square, *Bristol BS2 8HY. Closing date 6 September,* 1977.

CITY OF DERBY

Principal Computer Assistant

Grade PO1 (3) £5512-£6097
including £520 salary supplements

The successful candidate will be required to control and develop the systems and programming function in respect of new and existing applications from identifying users requirements to successful implementation and maintenance. *The duties include preparation of reports for management team* and will involve deputising for the Computer Manager in his absence.

Wide systems and programming experience is required *preferably on I.C.L. machines and in local government,* together with relevant professional qualifications.

The Council operates a 48K I.C.L. 1902S installation running extensive real time local and remote V.D.U. based systems.

Generous resettlement expenses will be paid in appropriate cases.

Application forms and further details may be obtained from the City Treasurer, Council House, Corporation Street, Derby DE1 2FE (Derby 31111 extns. 818 or 828).

Closing date Friday 9th September, 1977.

16 Bedford Row
London WC1R 4EB
01-242 9356
Telex 21120

OCC

Specialists since 1971 in UK and international computer appointments

occ computer personnel limited

LARGE REAL-TIME SYSTEMS

to £7,000

Our client is a leading UK based Software House with units based in LONDON and HOME COUNTIES. A choice of base will be offered to the successful candidates.

A new unit has been set up to meet the requirement for 2900 customers in the systems and programming activities, running in 2 Operating Systems environments, VME/B and VME/K, for medium and large systems.

Two specialist teams are to be founded, one in VME/B and the other in VME/K. SENIOR ANALYSTS and PROGRAMMERS with large Real Time systems experience are required to staff these two units.

We are particularly interested in PROGRAMMERS with communication software experience (at least 3 years) and Team Leaders who have worked as Technical Managers. ANALYSTS should have been involved in the design and implementation of large Real Time systems or commissioning of applications using communication networks, for end users. They will have worked on the practical aspects of a customer requirement and have a minimum of 4 years' experience. AIRLINE RESERVATION experience would be particularly relevant. **Ref: 569/CW/RN.**

To apply for these positions, or for further information, please telephone or write to Renée Nute on 01-242 9356. If it would be more convenient to telephone in the evening or at weekends, please telephone 01-874 5372.

Computing Services Association

Assistant Group Leader

The Electricity Council is the central co-ordinating body for the electricity supply industry in England and Wales.

THE JOB
- —Design and implementation of computer systems.
- —Supervision of a small programming team.
- —Liaison with Electricity Council and Area Board users.

THE FACILITIES
- —Remote batch terminal to a large IBM mainframe.

THE PERSON
- —Mature outlook.
- —Awareness of the proper role of EDP.
- —Able communicator.
- —Innovative approach.
- —Appreciation of budgetary constraints.
- —Capable of working with minimum supervision.

THE REQUIREMENTS
- —Technical education desirable.
- —Up-to-date with computing advances.
- —Experience of programming schedules estimating.
- —Knowledge of IBM 370 and COBOL preferred.
- —Additional computing languages, skills, experience, etc. an advantage.

THE ENVIRONMENT
- —Modern air-conditioned offices.
- —Subsidised canteen.
- —Sports and Social Club.

THE SALARY
- —Within a range from £4,277 p.a. to £5,577 p.a. inclusive of London Allowance and Supplementary Payments.
- —Plus a further supplement.
- —Contributory Pension Scheme.

TO APPLY
Write in confidence, giving age, career to date and present salary quoting CW/95 by 5th September to:–

Duncan Ross,
Recruitment & Development Officer,
The Electricity Council,
30 Millbank, London, SW1P 4RD.

ELECTRICITY COUNCIL

SALES TRIP BERMUDA!
SALES EXECUTIVE £10,000 + car

Recognised as one of the largest/most successful mini computer manufacturers in the world. Extensive user base built on a reputation for first-class systems/engineering support, strong management, enlightened marketing and a sound financial basis (t/o exceeds $100m). Share in this reputation — enjoy high rewards— enhance your career prospects. Excellent training U.K. and United States prepares you for success. Generous basic (reviewed this year)+ realistic targets (really high commission) + car. In 1976 20% earned a 5-figure income and the best went to Bermuda! Book your flight now! Ref. SS 1088.

ab executive (KINGSTON) 01-546 9473

LEICESTER POLYTECHNIC COMPUTER CENTRE

Applications are invited from suitably qualified and experience personnel for the following post

PROGRAMMER

This post will provide the opportunity to work on a wide range of application programs

Salary. £2529-£3282 plus supplements of between £454-£482 p.a.

Application forms and further details available from Staffing Officer, Leicester Polytechnic, P.O. Box 143, Leicester LE1 9BH. Tele Leics 50181, Extn. 2301.

CAPITAL APPTS.
COMPUTER SERVICE ENGINEERS
Phone for free jobs list.
All areas
SALARIES TO £6,005
34, Percy St. London, W.1.
637 5551 day, 445 0468 eve.

Data Control Clerks

c.£3,200

Overseas Containers Limited operates services from the UK and European ports to Australia and the Far East and is currently implementing a massive investment programme into new trade routes to South Africa, New Zealand and the Pacific Basin; upon completion, we will have one of the world's largest container fleets.

Because of this investment in the future, our computer installation is being considerably expanded and over the next two years, our existing hardware will be doubled to two IBM 370/158's. This expansion has created new opportunities for young men and women wanting to further their careers in data control.

You will be working as part of a new shift team, covering all areas of data control. Aged over 19, you must have at least one year's data control experience and a good working knowledge of JCL including job set up, preferably in an IBM installation.

Apart from the genuine career prospects in an expanding environment, conditions at our City based installation are first-class. They include season ticket loans, pension and life assurance schemes and a subsidised staff restaurant. For further information and an application form, contact Janet Spalton, Overseas Containers Limited, Beagle House, Braham Street, London E1 8EP. Tel: 01-488 1313.

OCL

IBM SOFTWARE SPECIALIST LONDON Circa £6,500

Our Client is a leading British Systems House with subsidiary Companies in the major European countries.

They are seeking an experienced IBM Systems Programmer to play a key role in the development and implementation of a family of application software products.

Essentially, you will possess:
- ★ 3 years' IBM Systems Software Programming
- ★ T/P experience
- ★ a demonstrable problem-solving ability
- ★ a firm intention to increase your technical skills

The position will present a varied and challenging future on a wide range of systems software development and operation problems — with projects including T/P real-time and database.

CONTACT: LONDON OFFICE on: 01-935 0671 REF: 77/08/19

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 3BD

LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

SCR

DAYS ONLY
NCR OP
c £3000 p.a.
City
Phone 01-439 6481
(24 hours)
EFFECTIA GRAVIS
Personnel Consultants

Computer Professionals

SOUTH MIDLANDS

A very successful medium-size capital goods Manufacturing Company - current turnover £25 million, operating a 370/138 under DOS/VS with POWER/VS and SHADOW are continuing to expand their Computer Services Division and require the following key personnel:

SYSTEMS PROGRAMMER to £5,500
Responsible to the General Manager — Computer Services for the evaluation and implementation of new software together with the maintenance of that existing. Candidates should have a minimum of one year's DOS/VS system programming experience, preferably with a working knowledge of SHADOW II.

SYSTEMS ANALYSTS to £5,000
Reporting to a Systems Project Leader, each Systems Analyst will be responsible for technical development of new systems. Applicants should have a background of PL/1 or COBOL programming and should ideally have had some previous involvement in the design of on-line systems.

PL/1 PROGRAMMERS to £4,250
Responsible to the Chief Programmer for the development of batch systems. Minimum of 6 months PL/1 experience in a DOS environment is required though re-training of COBOL applicants may be considered.

ASSEMBLER PROGRAMMERS to £4,250
Reporting to the Chief Programmer and responsible for development of on-line facilities using SHADOW II. Applicants should have a minimum of one year BAL experience.

The Company operates a Contributory Pension Scheme and generous relocation expenses will be paid where applicable.

RILEY CONFIDENTIAL REPLY SERVICE.

Apply in strict confidence quoting Ref. No. 1768 details of career to date and listing any companies to which you do not wish your application forwarded.

WILLIAM NEWTON, Riley Management Selection (Services) Limited, Old Court House, Old Court Place, Kensington, London W8 4PD.

A member of the Rex Stewart Group

LONDON BIRMINGHAM BRISTOL EDINBURGH GLASGOW
MANCHESTER NEWCASTLE NOTTINGHAM

Riley

DAYS ONLY
NCR OP
c £3000 p.a.
City
Phone 01-439 6481
(24 hours)
EFFECTIA GRAVIS
Personnel Consultants

PROG. AVAILABLE
PDP 11
MACRO 11 RSX 11
01-560 5587 (Eves.)

SHIFT SUPERVISOR
c £4600 p.a.
IBM OS JCL
London
Phone 01-439 6481
(24 hours)
EFFECTIA GRAVIS
Personnel Consultants

UNIVERSITY OF ABERDEEN
COMPUTING CENTRE
Research Fellows in Database Management

Applications are invited for two research fellowships, one at a senior level, for investigation of monitoring and consequential redesign of CODASYL type databases, and construction of high level interface with built-in monitor. The Computing Centre has an existing research project on database restructuring and is a member of the CODASYL DDLC. The database team of the Centre has considerable experience of database software development and of database applications. A service is currently provided using IDS/II on a Honeywell 66/80 computer.

Applicants should have a post graduate qualification in Computer Science or a good honours degree with several years relevant experience.

The project is funded by the SRC initially for three years. Salaries will be on the scales £3,333-£5,627 or £6,423-£8,655 with appropriate initial placement.

Further particulars from the Secretary, The University, Aberdeen with whom applications (2 copies) should be lodged by 15 September 1977.

Greater Glasgow Health Board

SYSTEMS DESIGNER

Salary Scale: £4006-£4863 + £520 flat rate supplements

Applications are invited for the above post within the Board's Computer Applications Unit. Candidates should have a good knowledge of systems design and the ability to supervise staff working in FORTRAN/PLAN.

Application form and further details may be obtained from the Personnel Officer, Greater Glasgow Health Board, 351 Sauchiehall Street, Glasgow G2 3HT, to whom completed forms should be returned by Wednesday, 31 August.

SALES EXECUTIVE

YOU CAN EARN
£15,000 p.a.
(OR EVEN MORE)
WITH MARCOL

If you believe that you can persuade us that you are good enough, and have:

2 years' experience of selling consultancy and software services.

A sound knowledge of the D.P. market place.

An in-depth background in the Data-Processing industry.

The ability to work under pressure.

Then call us now. Phone Mike Doran on 01-402 9355, Marcol Computer Services, 60 Queens Gardens, London W2.

An associate of The Norwich Union Group. NORWICH UNION

Systems Analyst Senior Programmer

(Experienced in PL/1)

£4,900 to £5,399 depending upon age, qualifications and experience

To form part of a project team working on a variety of batch and teleprocessing systems. Applicants must be able to demonstrate several years' experience in the design and implementation of such systems. Ability to communicate effectively with users at all levels is essential.

LOLA (London On-Line Local Authorities) provides computer facilities to a consortium for four London Boroughs. The Computer Centre is situated in modern offices at Enfield and current equipment is a 2-megabyte 370/158. On-line updating facilities are supported in over 100 remote VDU's with programmes written in PL/1 running under IMS/VS by the end of the year.

Full details and applications form returnable by 19th September) from:

Mrs. S. Dorrington, LOLA, Tower Point North, Sydney Road, Enfield, Middx. Tel. 01-366 6611, ext. 278.

HOWARD

BELGIUM

SENIOR COMPUTER SYSTEMS DESIGNERS

SALARY C £16,000 P.A.

Following the successful completion of the design assessment phase of a packet switching network we now wish to appoint several Senior Designers with recent experience in real-time communications. Ideal applicants will have packet switching experience but we welcome applications from people with experience in a related field (e.g. distributed processing, HDLC, etc.).

Initial task will be the production of the main sub-system specifications and maintaining the integrity of interfaces during the design phase.

This is a unique opportunity for the career orientated to develop experience in this new and challenging field.

Since design and development on this project is on-going the assignment is essentially long term.

Applications in the first instance to:

G. Ryan, Tel. No. 01-953 4066
Overseas Recruitment Consultant
Howard Organisation Int.
Employment Business Section

SOMERSET G3 PROGRAMMER

Debenhams Limited wish to augment their Operating System Support Department in Taunton, Somerset. We are currently running two 128K 1903T's under George 3 and require staff experienced in programming and/or operations. The Company is evaluating 2900 at present, and knowledge of VME/E would be an advantage. The G3 department is responsible for the maintenance of the operating system and the technical support of the Operations Department. Applicants should have a background of Plan or Cobol programming on a George 3.

There are good working conditions, four weeks' holiday and discount on purchases in stores. A contributory pension scheme is in operation. Salaries in relation to experience.

Please write to: **B. F. Cooper, Personnel Manager, Debenhams Limited, Bedford House, Park Street, Taunton.**
or telephone: **David Jorgensen, G3 Programmer, Taunton 87979, Ext. 88**

COMPUTER OPERATORS

Commencing Salary (including Shift Allowance) up to c£3,850 per annum.

We are seeking additional staff with at least 18 months' experience of George 3 and/or OS/VS1 on configurations similar to our own.

Our equipment includes an ICL 1904S run using George 3 and MOP, an ICL 1904S run using George 2 and Maximop, an IBM 370/145 run under OS/VS1 (to be replaced by a 370/148 by the end of the year) and 2 2903s.

Valuable fringe benefits including FREE TRAVEL FACILITIES on London Transport services.

If you are interested and would like further information please telephone the Senior Operations Supervisor on 01-837 9144 or write to Staff Appointments and Development Officer (Ref. 851/C), London Transport, 55 Broadway, London SW1H 0BD.

LONDON TRANSPORT

RACS

Programmers

£3,800-£4,600

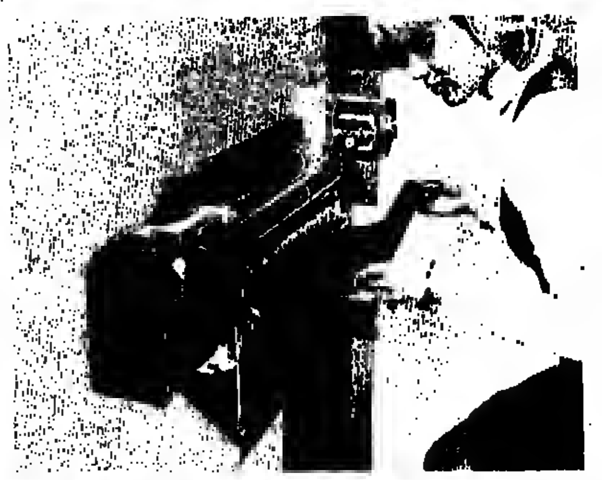
Applications are invited from persons with at least two years' programming experience and the ability to assist in systems analysis and design.

The development team is involved in many varied projects using an IBM 370/145 running under DOS/VS and CICS/VS.

Please write giving brief details of qualifications, experience and age to:–

Financial Controller
Royal Arsenal Co-operative Society Ltd.
147 Powis Street, Woolwich, London, SE18 6JN

PRODUCT NOTES



Still trying hard is Data Efficiency of Hemel Hempstead which has followed up its work on behalf of the "Fairer Sex" by solving the mystery of the Black Hand Gang.

Previously, DE's Dataribbons have always had a pair of disposable gloves packed in each box. Despite this, fingers occasionally got blackened when changing ribbons. This worried the men at DE and they investigated it in depth.

Now, at no extra cost to the user, each box will also have a small towel impregnated with a cleanser to remove the last trace of those accidental smudges thus eliminating the Black Hand Gang.

Data Efficiency Ltd (CW), Maxted Road, Maylands Avenue, Hemel Hempstead, Herts. Tel: 0442 57137.

Line printers for military jobs

A FAMILY of line printers for military and government security applications, the Tempest 2200 Series, has been introduced by Dataproducts.

The three models, the 2237, 2287 and 2207 run at 300, 600 and 900 lpm, respectively. Prices range from $15,000 for the 2237 to $20,000 for the 2207.

One of the most important features of all three models is a radio frequency interference, RFI, tight enclosure. This, according to Dataproducts, meets the requirements of the US government specifications concerned with the control of electromagnetic radiation — NACSEM 5100 and MILSTD.461.

The Tempest printers incorporate the patented Dataproducts Mark IV hammer-actuator which has a single adjustment and a mean time to repair of 45 minutes.

Other features include a standard paper shelf for forms stacking and static eliminator to aid forms handling in conditions of low humidity. Options include a 12-channel direct access vertical format unit, DAVFU, which eliminates paper tape for forms definitions.

Dataproducts International, (CW), Sterling House, 31/39 South Street, Reading, RG1 4QT. Tel. Reading (0734) 585723/6.

Fiche reader

GREATER clarity and more positive tracking of image are key features of a new microfiche reader from Caps Microfilm.

Called the Datamate 80, the reader has a new lens system which maintains constant focus and can be interchanged with 24, 42 or 48 times magnification systems.

The Datamate also provides an 80% enlargement of microfiche generated by computer and has an optional dual microfiche carriage.

The non-glare screen measures 230 x 290 mm. The unit measures 390 x 320 x 470 mm high and weighs 9.5 kg. The Datamate 80 costs £155.

Caps Microfilm Ltd (CW), 7 Westmorland Road, London NW9 9RG. Tel. 01-204 4111.

Binders

A PRINTOUT filing system consisting of corrugated fibreboard shelves and plastic binders has been launched by Bankers Box as an alternative to expensive metal shelves and binders.

Each binder in the Data-Pak system can take 1,200 sheets and handle paper sizes of 326, 368 or 389 mm by 278 mm. The binders have self-erasing labels and carrying handles.

The shelves interlock, enabling the user to build up complete shelving units. They can take any weight of printout because of steel frames which also help to keep them in position.

A system for storing eight binders costs £33.20 including the binders themselves.

[illegible] Storage Systems (CW), [illegible] Road, Kirk Sandall, Doncaster DN3 1HT, South Yorkshire. Tel. 0302-884566.

Patching module

A LINE patching module which allows the user to cross patch two or four wire sets between variable frequency lines and modems by patching cords has been introduced by the Bucks firm of Lion Systems Developments.

The 1650 module, which has a monitor position for diagnostics, measures 102 by 207 by 127 mm high. A rack mounted frame which can take eight modules for multiple cross patching is available.

Lion System Developments (Gerrards Cross) Ltd, Halifax Road, High Wycombe, HP12 3SE. Tel: High Wycombe 35028.

Breadboard

A BREADBOARD system designed to help both the professional electronics engineer and the enthusiastic hobbyist make and test circuits has been introduced by Continental Specialties.

The QT system comprises sockets and bus strips which can be locked together in any pattern to form breadboards of any size.

The system eliminates the need for soldering. The sockets and bus strips will take most components.

Each socket is made up of rows of five contacts and each bus strip has two rows of contacts.

The contacts are designed to connect and disconnect quickly without damaging sockets or components. Socket sizes range from 5 x 118 contacts to 2 x 80 contacts.

Continental [illegible] Corporation (CW), 44 Kendall Street, P.O. Box 1942, New Haven, Connecticut 06509, USA. Tel: 203/624 3103.

Range of digitisers

A RANGE of digitisers has been introduced by Calcomp. Called the 600 series it comprises six models with surface areas ranging from 11 x 11 inches to 60 x 44 inches.

A 600 Series unit can be used to digitise engineering drawings, maps, sketches and photographs and comes with a touch button control panel that enables the operator to select any one of five operating modes. These are point, increment, remote, run and track. The last two can be at rates varying from one to 100 co-ordinate points per second.

A special feature of the 600 Series, according to Calcomp is an electronic servo loop and switching circuit which activates a single one inch square around the digitising pen or cursor. This provides the digitiser with a captive origin which cannot be lost if there is a break in the digitising process.

The accuracy of 600 Series digitisers is ±0.025 cms and the resolution is 100 lines/cm. For special applications these can be improved to ±0.0127 and 400 lines/cm.

Calcomp Ltd, Cory House, The Ring, Bracknell, Berkshire, RG12 1ER. Tel. Bracknell (0344) 50211.

Anti-static mat

A LOW cost incremental plotter made in the US by Houston Instruments has been introduced to Europe by Pragma. Called the DP-10, the unit plots on paper measuring 245 mm x 358 mm at speeds of up to 300 increments per second.

The DP-10 can use ball point or felt tip pens. The paper is held on a vacuum system which allows the plotter to be used horizontally or vertically. The plotter is available for standard 19-inch racks.

The DP-10 is compatible with most standard plotter interfaces and can also be used with communications controllers, including Houston Instruments' own PTC-50.

Pragma Ltd, Middlesex House, 29 High Street, Edgware, Middlesex. Tel. 01-952 6471.

Plotter

FROM Mervillin is the Compumat anti-static mat that has an electrical resistance of between 2 x10[illegible] and 5 x 10[illegible] ohms at 30% relative humidity.

For installations which want a complete dust-free environment, the mat can be used in conjunction with Mervillin's Fast-two anti-static emulsion. A free telephone consultancy service is also available.

Mervillin Ltd (CW), Channels End, Colmworth, Bedford, MK4 2NS. Tel. Colmworth (023 062) 291.

Files

A SIGNIFICANT advance in suspension filing is claimed by the Bronester Group with the introduction of additions to the company's File-Away range.

The files are coded for easy identification in four colours. They have thinner faced boards which allow more files to be fitted in to each drawer. Sharp metal parts have been replaced by plastic ones.

Bronester Group Ltd, (CW), Bronester House, 81-89 Fortress Road, London NW5 1AY. Tel. 01-267 6421.

Puzzle answer

ONCE the formula giving "the chance of a number plates all being different" reaches a total which is less than 0.5 the "n" concerned will be the number we are looking for.

The appropriate mathematical expression is: [illegible] x 997 x [illegible] x 995 [illegible] which falls below 0.5 when n equals 38.